INNOVATION IN DESIGN EDUCATION

Proceedings of the Third International Forum of Design as a Process

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INNOVATION IN DESIGN EDUCATION

Theory, research and processes to and from a Latin perspective

Edited by
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FOREWORD

The evolution of design is parallel to the evolution of design education. Some phenomena in particular are shaping the contemporary world of design education: the development of countless private design schools; distance learning; the birth of structures and laboratories that allow students to pursue a fully experimental education; the regulation of public education pushed by the respective countries' education ministries; the proliferation of associations that organize continuous professional update education programs; and the increasingly intensive relationship between companies and schools.

Therefore the aim of the Third International Forum of Design as a Process[1] was to present an overview of the ongoing changes in design's educational processes. This represents a central theme for the members of the Latin Network for the Development of Design Processes[2], always involved in recognizing crucial phenomena of the design debate, studying the processes and practices used to disseminate and develop design as a culture and growing through a mutual exchange of research and experiences.

The structure of the book is the same as that of the three-day conference, which was held in Torino (Italy), in November 2011. It also reflects the three main tracks chosen to outline the current innovations in design education: the relationship between education and companies, innovative instruments for design teaching, and research for education. One more session ("The school talks about itself") was established in order to bring visibility to the host school and create a positive dialogue with the representatives of the international community present on this occasion.

An introductory essay defines the cultural influences of design education over the productive system, while full papers document the contributions of the seven keynote speakers. Finally, the Forum of Torino was the occasion to introduce the Design Processes Award, a special recognition to a representative person from the host country responsible for an outstanding advance in the field of design processes.

The book also presents the contributions of members of the international scientific community, who were selected as discussants in the four main sessions of the event. The num-

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[1] "Design Cultures as Models of Biodiversity" was the title of the First International Forum held in 2009 in Porto Alegre (Brazil); the Second International Forum (Aveiro, Portugal, 2010) was focused on the cross-fertilizations between design, art and craft. The Fourth International Forum will be held in Belo Horizonte (Brazil), in September 2012, with the title "Diversity: Design-Humanities".

[2] The Latin Network was set up in 2008 during the international conference "Changing the Change", an event included in the program of Torino First World Design Capital of Icsid (International Council of Societies of Industrial Design). It is an informal group of researchers and university professors of design interested in understanding the change that is happening inside Latin cultures, how these cultures interact everyday with others, and how other cultures are permeating Latin ones. Now it counts more than 50 members from 19 universities of 10 countries.

ber of countries represented has grown over the past four years: there were 32 researchers from Latin Europe, 22 from Central and South America, and 4 from Northern Europe, Turkey, and North America.

During the organization for the setting of the conference, a great contribution came from the scientific committee composed of Luigi Bistagnino, Flaviano Celaschi, Dijon De Moraes, Claudio Germak, Pier Paolo Peruccio, Paulo Reyes, Rui Roda, and Carlos Teixeira.

Finally, the Forum would not have been possible without the hospitality of the Politecnico di Torino, the generous commitment of professors Luigi Bistagnino and Claudio Germak and the help of researchers, professors and graduate students of the Department of Architecture and Design (Design Course).

Elena Maria Formia, Head of the Forum's organizing committee

EDUCATION FOR DESIGN PROCESSES: THE INFLUENCE OF LATIN CULTURES AND CONTEMPORARY PROBLEMS IN PRODUCTION SYSTEMS

Flaviano Celaschi[1] and Elena Maria Formia[2]

THE HUMAN RESOURCE AT THE CENTRE OF THE PROJECT

The theme of design education is always topical, and can be approached from different perspectives. If we try to observe it from the productive point of view, it is evident that there are many possible new interpretations to outline.

Production factors include materials, means of production, capital, and human resources. In processes where design confers potential added value, human resources are by far the most strategic factor.

All of the human resources involved in the production process are important: the designer, the client, the production technician, etc. However, nowadays it is especially important to train the end-user, because the commodities produced by contemporary design are comparable to cultural assets and require a consumer who is capable of recognising differences in value. Moreover the end-user is increasingly involved in the process of co-production of value along the entire value chain of industrial products and services.

Thus the importance of training extends to new figures; but, at the same time, there is increasing awareness among young people, who are undertaking professional training, of the richness and complexity of the design profession.

The number of students aspiring to pass the admission exams for university design courses has been growing steadily in all the mature industrial nations for over fifteen years, while the most important universities in the newly industrialised countries are preparing to offer new design courses.

Furthermore, design thinking is now enjoying the respect of the best management faculties around the world. There is great interest in design's ability to offer methodologies and instruments that can give material form to ideas and concepts in the pre-industrial phase of productive processes. However, this success does not automatically provide designers with a key to the "control room". Within this system of knowledge (still firmly entrenched in

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[2] Post-doctoral Fellow, DAD, Politecnico di Torino, head of the organizing committee of the Third International Forum of Design as a Process (Politecnico di Torino, Italy, November 2011).

position governed by financial processes or by productive creativity) the idea persists that it is possible to create design or use design logic without people who are adequately trained in design culture. The dream of Anglo-Saxon management, exhausted of ideas and emotions, is to import "design thinking" without importing "design thinkers" - a mistake based on the overestimation of methods and tools rather than on a balanced interplay of knowledge and skills.

At the same time many important multinational companies have begun in-house training of their intellectual workers, and are organising "creative workshops" aimed at stimulating their human capital.

In newly-industrialised countries, by contrast, more and more graduates in engineering, marketing, management and human sciences are reorienting their careers by undertaking research doctorates or attending highly specialised courses in design. Professions and skills are losing their rigid boundaries and are beginning to cross-fertilise, yet even so there is a tendency to reject the idea of becoming a designer, in exchange for appropriating only a few typical design practices. Creativity courses are led by engineers who have studied design, conceptual brainstorming based workshops are supervised by marketing managers, and creative empowerment activities are entrusted to anthropologists.

Everyone studies design but very few truly want to become designers, or allow designers to make important decisions. Design no longer instills fear, but designers do. Design enters the corridors of power, while designers are still relegated to companies' technical offices or consulting and creative firms.

We need to understand this gap in order to know how to react, starting from the training of designers and from the need to foster new enterprises focused on design and created by and around designers. Existing industries are conservative organisations, based on ford-era engineering or managerial models or post-fordist financial models, and are unable or unwilling to abandon a reasoning based on production or markets. Unless they do, it will be impossible to give design culture the space it needs to reform production and the processes that are part of it.

DESIGN TODAY
- De-materialization
- Globalization of markets
- Limits to resources and adequacy of responses

DESIGN PROCESSES
- Continuous innovation
- Centrality of problem finding
- Renewal of relationship between creativity and industry

ASPECTS OF LATIN CULTURE
- Local and globish identities
- Arts & crafts and micro-enterprise
- 2.0 designer

EDUCATION PROBLEMS AND OPPORTUNITIES

- Degrowth culture
- From distance learning to learning for a global context

- Creation of new innovative enterprises and design-driven start-ups

- Single master vs open source

**TOWARDS THE CREATION OF INTEGRATED SYSTEMS OF WIDESPREAD PRODUCTION INTELLIGENCE**

FIG. 1. SUMMARY OF THE WORK PROCESS GUIDING THE THIRD INTERNATIONAL FORUM OF THE LATIN NETWORK FOR THE DEVELOPMENT OF DESIGN PROCESSES (TORINO, NOVEMBER 2011).

METHODOLOGICAL CRISIS AND CULTURAL FORMATION

We believe that the overrating of design as a methodology is the cause of the "uncertainty" of the designer's position within contemporary production processes.

In the B2B knowledge market, which is useful for reforming enterprise, a need has arisen to establish a place for design within tools that are importable, reproducible and, above all, independent from the identity or mixture of identities characterising every creative moment oriented towards the market. The dominant ideology in the disciplines that still govern productive processes in corporations is unable to treat innovation as a structural matter. What commonly happens is that the commodities produced, or at least the image of the enterprise (the frontline), receive a sort of superficial "face-lift" of processes. In other words, the enterprise does not possess an entrepreneurial culture, but only an entrepreneurial methodology. On the contrary, the culture of design processes, which we defend and support through the Latin Network for the Development of Design Processes, aims

to give a structural role (a role that can reproduce models for value production that are capable of guiding society) to enterprise in contemporary society. The industrial world has always thought, and continues to think, that the economy is the society; that, in the economy, the perpetuation of profit is able by itself to sustain the social system; that it does not matter whether we favour financial profit or a kind of profit that is capable of influencing the material culture of a society.

Within this complex crisis in the western-capitalist production system, the revolutionary potential of continuous innovation has not yet been recognised. To an even greater extent, there is no perception of the importance of thinking about continuous innovation of processes of value production, rather than just renewal of products. Yet the transcontinental crisis of our times is pushing towards a more radical renewal of production systems and of the role of enterprise in contemporary society.

What is certain is that there are two models, and they are poles apart. On one side is a late-capitalist model that absorbs design as a methodology and, in applying it, tries to change the structure of enterprise and its role in society as little as possible; on the other side is an attempt, by now quite widespread and not limited to designers, to think towards a renewal of the production system based on a redefinition of the roles of producer, consumer and mediator. Within the mediation process there are innumerable opportunities for design knowhow and for the roles of the contemporary designer.

With regard to the second model, the situation is interesting:

· The designer continues to be part of the production system, but becomes a strategic actor in decisions about why, what and how to produce; public administrations need designers to guide and innovate these processes; new companies can be created on the basis of input generated by designers and can be governed by them thanks to a logic that gives ever more space to an "esthetic" of organized productive processes.

· The designer must become capable of animating and developing an active and innovative mediation system. This means being able to intervene in production models that no longer have factories, even in the third world, that do not provide work according to the 19th Century logic of the salary (in exchange for the workers' production time), that do not use resources without regenerating them and returning them to the place they originated from.

· The designer is no longer distanced from the consumer. The consumer who is asked to co-produce value does not become a designer, but both can give life to processes of reciprocal co-action based not on "consumption" but on relationships and conviviality (Illich, 1981).

THE SUCCESS OF THE DESIGNER OF PROCESSES IN CONTEMPORARY CREATIVE SYSTEMS
Throughout the last century, design confirmed its place in Europe and the United States thanks to the role of the designer as author of the product[3]. During the same period, how-

ever, the legitimacy of the designer as author of innovative and original processes was not recognised, except in academic environments that did not derive from design culture but from the technologies and sciences related to organised human processes (Alexander, 1967). Within the Italian experience alone, innumerable designers built a reputation for the uniqueness and originality of their process of design. Some examples are Studio Sottsass and Memphis, Alessandro Mendini and his versatile activity surrounding publishing, training, stylism, creative consulting, product design, coordinated image, etc.; Giulio Iacchetti and Matteo Ragni and their network activism within a generation of Milan designers in the first decade of the third Millenium; Andrea Branzi and the affirmation of the centrality of design culture over methodologies. And yet, throughout the last century, journalists, editors, historians and critics have preferred to portray and codify designers in terms of their capacity-opportunity to mould objects. Thus important designers like Alberto Seassaro, Ezio Manzini, Giovanni Klaus Koenig, Carmelo di Bartolo, Stefano Marzano and many others whose work has exclusively concerned processes, do not appear in the histories of contemporary design. Commonly, designers are still portrayed mainly with respect to the final output rather than the originality of the process.

Creative interventions in processes are difficult to prove and to testify. Usually they are narrated by scholars or pupils who took part in these complex itineraries and managed to collect traces, semi-finished products, documents, etc.

In the absence of masters and histories of processes, it is difficult to consolidate in the collective imagination, especially for young people who are thinking of studying design, the profile of these specific kind of designers.

It is not our intention to justify a separation of careers between "product designers" and "process designers". We believe that every good product designer must also be a process designer, while every process designer faces the need to give material and esthetic shape to his or her work.

However "process designers" still take a backstage role. All things considered the creativity of processes may find more fertile terrain in young students who have already undertaken solid training regarding products, interiors or communication and who, through these, have consolidated design-driver procedures and approaches.

THE REBIRTH OF LATIN CULTURES

Latin cultures have a strong connotation both from a quantitative and qualitative point of view[4]. Nevertheless, cultural references are guided by models of behaviour and consump-

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[3] In his introductory essay in the forthcoming book by Eleonora Lupo and Rebecca Pera (*Design e creatività tra saperi e processi*, in press), Flaviano Celaschi presents the hypothesis that, in contemporary design, creativity is the gift that the designer confers on the design process. The designer is the interpreter of a design theme in which he or she can intervene in the process of conceiving and planning as well as on the product, obviously within a system of constraints imposed by the context. Celaschi, F. (2011). *Il portato del soggetto nel design*. See: www.flavianocelaschi.net.

tion, and these are transmitted by the media. Web access is expanding, and even local matters have acquired the right to be heard. Thus, while a crisis has overtaken large systems for transmitting and distributing scientific knowledge dominated by the Anglo-Saxon publishing corporations (a crisis due mainly to the enormous costs involved in traditional processes of contact between client-user and producer), local networks that serve to exchange and enhance cultures and behaviours are springing up every day.

The crisis in consumption is progressively diminishing the importance of ownership of goods as tools for the pursuit of happiness; instead it is dialogue, relationships, conviviality, and social exchanges that are assuming progressive and overwhelming importance. Latin cultures generate, embrace, and enrich this change because these tendencies are the natural inclination of Latin people and of their models of socialisation and interpersonal relations. The breakdown of the copyright system (which had long penalized societies with no laws or systems of governance that could maintain strong control over the ability of patents, registered trademarks and ideas to generate economic resources) rewards those societies that have made open source their natural way of disseminating knowledge. The power of 2.0 knowledge sharing generates aggregates of knowhow that can compete with the large investments in structured research that are typical of Anglo-Saxon systems.

What we can observe, within the limits of this text, is the gradual disappearance of top-down models of knowledge control, replaced by the spread of immersive and relational approaches that reward networking, the transversal community, cloud computing and small local communities strongly connected daily with the outside world.

The Latin countries are opening up and equipping themselves to move people and experiences, starting businesses elsewhere and participating in massive and uncontrollable migrations of students and teachers.

The Latin world approaches other cultures with trust and openness. However there is a strong impression that the Anglo-Saxon world builds protective barriers and excludes what lies outside as aggressive and insignificant. There won't be a battle, because there is no conflict. There will be circular and alternate flows - and it is senseless to try to slow or hinder these flows - to which designers can bring their own personal contribution.

INNOVATION AND CREATIVITY AS A SYSTEM

At present, there is strong awareness of two distinct but interconnected systems: the level of the individual and his capacity to put himself inside the design process, and the level of collective creativity or a systemic sensitivity (made up of various operators who are different from one another in training, competences and interests) that is able to trigger multiple productive relationships. At this level it will become increasingly difficult to identify who

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[4] Central and South America, a third of Europe and a third of Africa speak Latin languages, and by 2040 it is projected that Spanish will be the majority language in the USA.

exactly "owns the rights" and can defend those rights.

The first subject resembles the devout pilgrim of medieval Europe, someone who, with his own experience and his passage, fertilises lands and people who are distant from but not indifferent to him. The second can be compared to a cloud: a shapeless community of subjects who converge, blown together by imperceptible currents and natural winds, and are concentrated in one place for a precise time interval, generating a wealth of spin-offs.

What we are beginning to study is the ways and processes by which it is possible to attract these clouds to a certain place and at a certain time, in order to transform these productive and social areas into fertile fields ready for cultivation by individual "creators" who are increasingly expert in design culture.

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DESIGN EDUCATION AND MANUFACTURING: WHO SHOULD CHANGE WHAT, AND HOW?

André Desrosiers[1]

The author extensively surveyed, observed, and interviewed designers from specific university and vocational college cohorts to obtain an overview of the careers of industrial designers within the manufacturing sector in Quebec. He also met with the executives of manufacturing firms to explore their perceptions and understandings of the role and utility of designers within the manufacturing sector. Through the use of both quantitative and qualitative methods, this study reveals that the higher the level of education of industrial designers, the less they are likely to be employed in the manufacturing sector. The manufacturing sector represents half of all industrial design jobs in Quebec. The work of designers in this sector is often more operational or logistical than strategic and somewhat different from what is conveyed by public discourse on industrial design. In this paper, the author discusses how education has a significant role in the acculturation of designers; shows that the dominant culture of industrial designers is that of consultancies; and proposes that this explains, in part, why designers and manufacturing companies still maintain a less than optimal relationship.

••• Professional practice; industrial design; manufacturing; education •••

The study of professional practice in industrial design is not new. The subject has been treated extensively by many authors, including Donald Schön (1983). At a local level, Trepanier & Gosselin (2007) aptly described the clients and organizations for whom designers work in Quebec. The authors noted an over-representation in the media and in universities of industrial designers from consulting firms. The Ministère du développement économique, de l'Innovation et de l'Exportation (MDEIE) recently published two studies on industrial design. The first highlights the low penetration of industrial designers (Abdel-Malak & Brassard, 2008) in manufacturing firms. The second provides a socio-economic overview of the various design professions, attaching particular importance to industrial designers (Quebec, 2010). It notes that designers working in the manufacturing sector have higher incomes compared to those working in professional services. My objec-

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[1] Université du Quebec à Montréal, École de design, Canada, Professor.

tives here are to document the current practice of industrial designers in manufacturing firms in Quebec and to highlight the specific cultural challenges facing the profession in this context.

METHODS USED

My study is based on several methods and various sources of information. Each method has its own limitations. As Stephen Kemmis (2011) points out in "What is Professional Practice?", a set of methods offers diverse perspectives that enrich knowledge of the subject. I reviewed the literature and the available data on industrial designers in Quebec, including data collected by Statistics Canada (Canada, 2006) and Services Canada (Canada, 2010). I then surveyed specific cohorts of graduates from various educational institutions in industrial and environmental design, at both the university and vocational college levels.[2] I selected cohorts from 1979, 1989, 1999, 2004, and 2009. To this end, I established a list of 574 graduates, of which I was able to trace the email addresses of 400. I invited the latter to participate in a brief survey; 191 responded favourably. I thus obtained a stratigraphical overview of designers in manufacturing companies.

Of the 191 respondents, I asked the 49 individuals working in the manufacturing sector if I could observe their work for one day. Thirteen agreed. These observations generated over 100 pages of detailed notes on the participants' use of time. Observations took place from summer 2010 to summer 2011. Finally, I met and interviewed four executives of manufacturing companies. These two parts of the study have qualitative value. I looked for trends or indicators of issues specifically related to professional practice. Particular attention was given to randomly selecting participants for the interviews and the observations.

SCOPE

The population of industrial designers working in manufacturing consists of individuals who have been trained in design in educational institutions in Quebec or elsewhere, and others without specific training in industrial design. Added and subtracted are individuals from other industries. There is usually some degree of exchange between industrial sectors, with designers transferring from consultancies to manufacturing firms and vice versa. Some designers leave or immigrate to Quebec to quit or join manufacturing firms. In addition, designers change jobs, titles, or occupations. These may represent promotions to management positions within the same company or with other companies in the manufacturing sector. Finally, job loss or retirement may reduce the size of this group. Figure 1 illustrates the scope of this study. It thus excludes individuals from engineering,

[2] Bachelor degree programmes at the Université de Montréal (Industrial Design), UQAM (Environment Design), Concordia University (Design & Computation Arts); vocational college programmes in Industrial Design Techniques at CEGEP de Ste-Foy, CEGEP du Vieux-Montréal, and Dawson College.

technical, and mechanical design schools, self-taught designers, and designers trained outside Quebec.
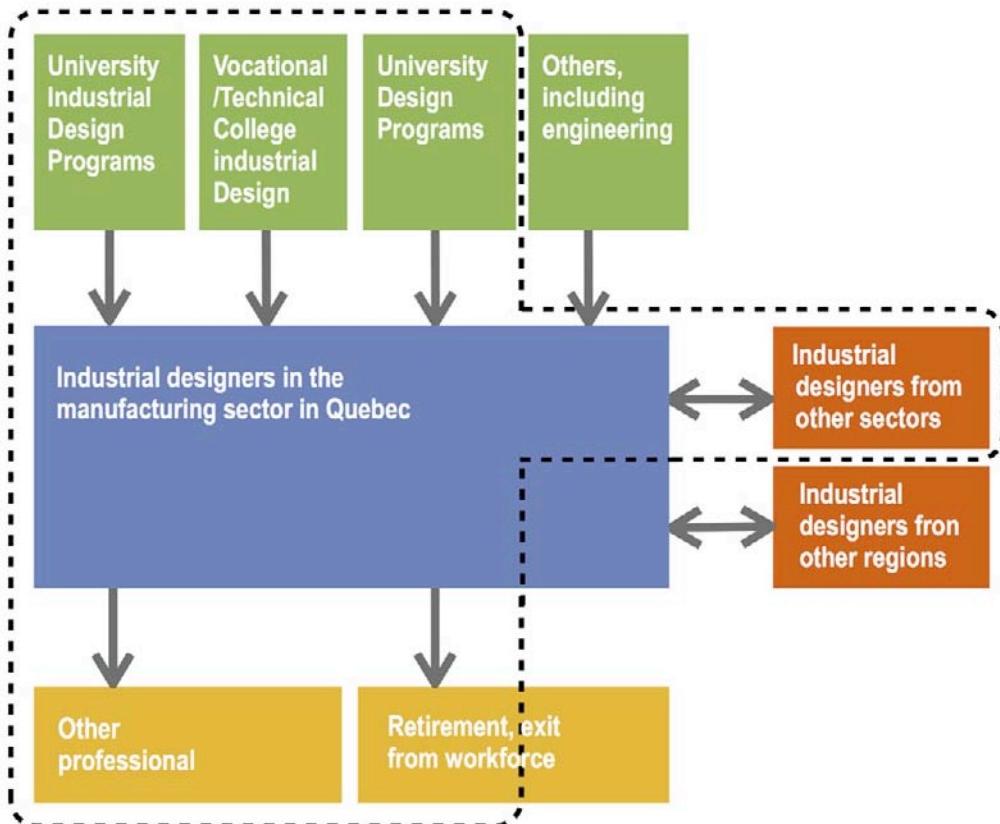
FIG. 1. MODEL OF FLOW OF DESIGNERS WITHIN THE MANUFACTURING SECTOR.

FINDINGS

Employment by sector

Based on Statistics Canada data from 2006, out of a population of 3,180 industrial designers in Quebec, more than half work in the manufacturing sector (Fig. 2). If, however, one examines the data collected in this study, just over a quarter of graduates of design schools work in this sector. How can this difference be explained?

A first answer is that the Statistics Canada census (left-hand chart overleaf) includes all individuals who declare themselves as industrial designers whereas my survey (right-hand chart) consists only of graduates. Secondly, graduates from my survey are distributed in a

wide range of industries, while the industrial designers in the Statistics Canada census are not distributed to the same degree. For example, individuals who have opted for teaching do not declare themselves as industrial designers, but as teachers or professors.

Considering that the 3,180 industrial designer jobs represent a large portion of the total demand for industrial designers and that the 3,100 graduates in design[3] occupy a large portion of these jobs, there is much less adequacy of supply and demand in the manufacturing sector than there is in professional, scientific, and technical services. In other words, graduates of design schools in Quebec occupy a large portion of industrial design jobs in professional, scientific, and technical services, but a much smaller portion of industrial design jobs in the manufacturing sector.

Employment by sector
Statistics Canada 2006

Professional Services
30 %

Others
9 %

Commerce
8 %

Manufacturing
53 %

Employment by sector
Design school cohorts

Professional Services
31 %

Others
3 %
Construction
4 %
Public Service and Administration
5 %
Information Industry
5 %
Arts, entertainment, and leisure
5 %
Teaching
8 %
Commerce
12 %
Manufacturing
28 %
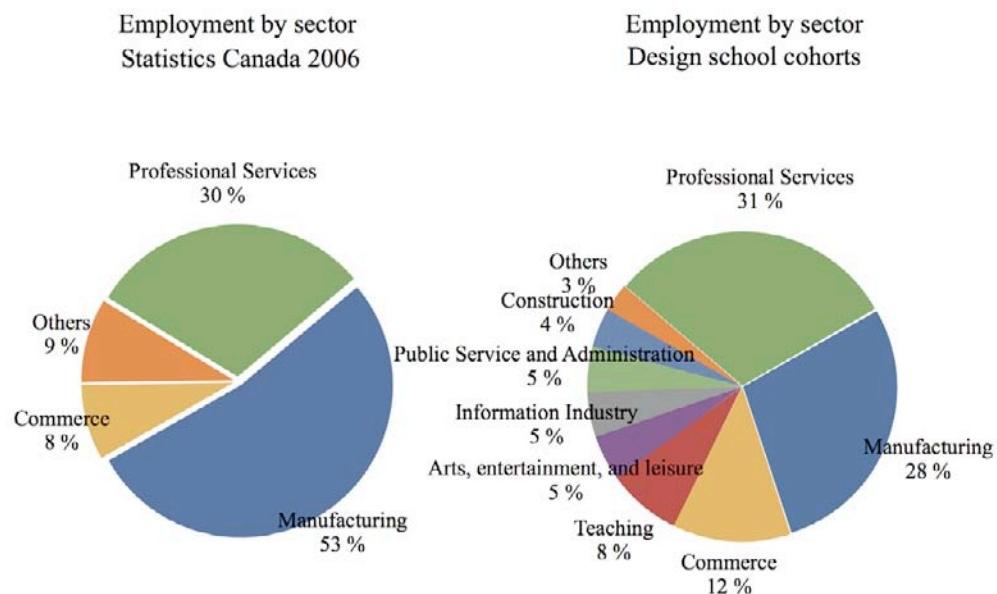
FIG. 2. DISTRIBUTION OF INDUSTRIAL DESIGN EMPLOYMENT BY SECTORS.

Education and manufacturing

Half of the graduates of vocational college programmes work in the manufacturing sector. This is not the case for the university graduates. Only a fifth of the university graduates opted for the manufacturing sector (Fig. 3). What explains this mismatch between job

[3] At the time of our study, there were 1,400 graduates from the Université de Montréal, 500 graduates from Concordia University, Dawson College, CEGEP de Vieux-Montréal, and CEGEP de Ste-Foy, and 1,200 graduates from UQAM, for a total of 3,100 graduates.

opportunities and career choices in the manufacturing sector for university graduates?
One can certainly look at the training curricula and the adequacy between this training and jobs in manufacturing companies to explain this difference. I will return to this subject and propose that the basic cultural elements specific to university design schools explain, in large part, this phenomenon.
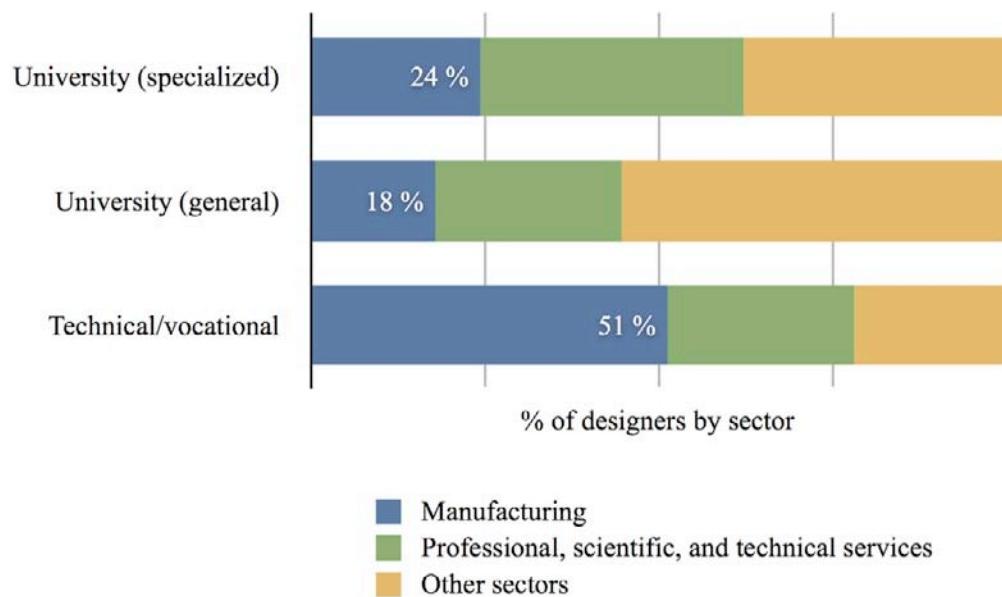

FIG. 3. DISTRIBUTION OF DESIGN EDUCATION BY SECTOR.

Cultural diversity of organizations
Industrial designers in the manufacturing sector often work in companies with more than 25 employees (Fig. 4). It is difficult to justify an industrial design specialist position in small manufacturing companies. Such a position can be justified when revenues are between \$5 and \$10 million, unless, of course, the incumbent performs several functions within the company.
In the design services sector, organizations have a certain cultural homogeneity. In Quebec, these organizations rarely exceed 10 employees. Individuals share professional and aesthetic values, and the management style is almost entirely based on mutual adjustment. Originality and creativity are celebrated. This is one of the aspects that distinguish the work environment of designers in manufacturing firms. These companies are larger, the work is more divided, and the technostructure is more developed. Designers in manu-

facturing firms are expected to collaborate and interact on a daily basis with people with diverse skills: marketing, sales, finance, and production. Social and interpersonal skills are strongly emphasized. While the work is broader and more diversified, its application (type of products) is narrower than it is in consulting firms. The culture of manufacturing firms is much more fragmented and is supported by socio-economic values; success, competitiveness, and teamwork are highly valued.
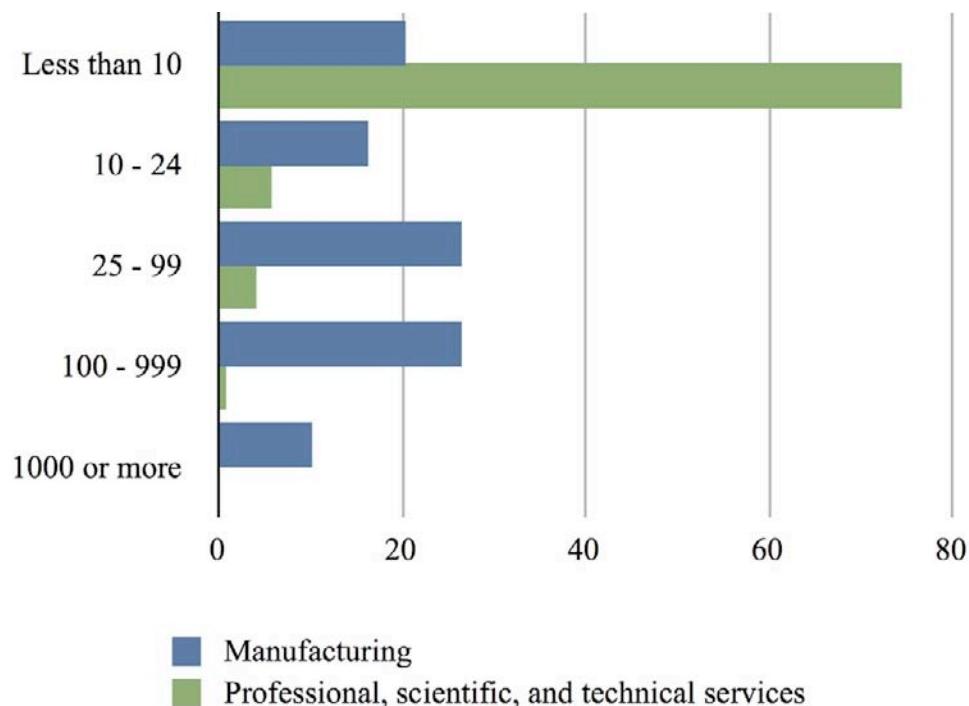

FIG. 4. NUMBER OF EMPLOYEES IN COMPANIES WHERE DESIGNERS WORK, BY SECTOR.

Nature of design within companies
I have borrowed extensively from Henry Mintzberg (1978) to describe the position of designers within various organizational structures and to illustrate their internal and external relationships within these structures (Fig. 5). The five parts of Mintzberg's organizational structure model are 1) the strategic apex; 2) the technostructure, which involves the mechanization of methods and procedures; 3) support staff, including, in particular, R&D; 4) the middle line, which acts as an intermediary between the strategic apex and operations; and 5) the operating core, which carries out sales and production of goods and services. In general, teams of designers either occupy the operating core or occupy the R&D department of the support staff. When designers occupy the latter position, they develop prod-

ucts relatively independently from the daily operations of the company. This allows some flexibility for these departments to define their own work methods and therefore how they develop the products on which the company relies.

Organizational structure by Mintzberg (1978)

Position of designers within the organizational structure

1 year   5 years   10 years   20 years   30 years
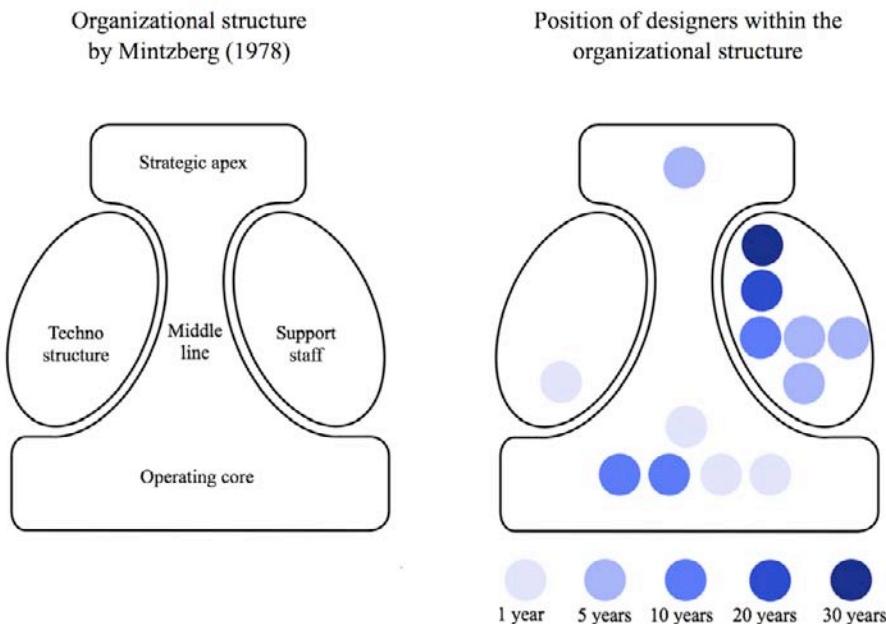
FIG. 5. POSITION OF DESIGNERS WITHIN ORGANIZATIONS.

There are also cases in which the design process is so ordered and regulated that it is more part of operations and closely defined by the technostructure. The work consists in responding to customer requests, through representatives, using a design methodology, tools, materials, and processes that are already closely controlled by the technostructure. This work has little impact on the technological choices and competitive advantages of the company. If the company gains an advantage, it is either in the design of the design system (thus beyond the scope of designers) or in the reduction of labour costs. This role of design is fairly typical in mechanic bureaucracies, i.e., companies that, after developing a winning formula, try to perfect it, improve it, and eventually standardize it. While this strategy works well in a stable environment, where technological advances are rare or minor and changes in the market (competition, lower consumption) are small, it is obviously a losing formula when major changes occur.

Between these logistical and operational strategies for design activities, one should not presume that one is better than the other; it is mostly a question of context. In many cases, both strategies coexist. The need for continuous improvement, for cost reduction, and for

product adaptation is common and can occupy both the operational core and the techno-structure. R&D services, or advanced research centres, whose projects are more strategic, also have their place within manufacturing organizations. In fact, it is often difficult for the same team to perform both functions, one more operational and the other more logistical or strategic. To obtain such divergent results, different methods and resources are needed.

User-centred methods or market-driven design?
My observations of the interactions of designers, summarized in Figure 6, show that the vast majority of their contacts and exchanges take place within their own part of the structure and within the company. When designers work with people in the company, but outside R&D services, their contacts are primarily with operations, i.e., with production and sales. Their relations with production are more frequent and sustained compared to those with sales and marketing. Designers also exchange with the technostructure, although increasingly, these exchanges are coded and transit through computerized information systems.
When industrial designers have contacts outside the organization, these contacts are mainly with suppliers and subcontractors. Indeed, contacts with customers are rare. Information from customers reaches the designers through the sales and marketing team. This information is necessarily filtered, organized, and processed by others. User-centred methods were followed by only one designer. If designers interpret the needs of users in their work, they must be doing so in indirect ways I have not observed.

My observation of the working relationships and formal and informal contacts of designers leads me to postulate that their work is more focused on the manufacturing and forming of products than on their definition. The approach of these designers is generally guided by marketing and sales departments. In other words, the designers give form to company projects more than they define them. Thus, what many claim to be strength of design seems to apply only rarely to practices observed in manufacturing firms.

The perceptions of manufacturers
I met with four manufacturing executives to understand their knowledge and perceptions of the potential, accomplishments, and contributions of industrial designers
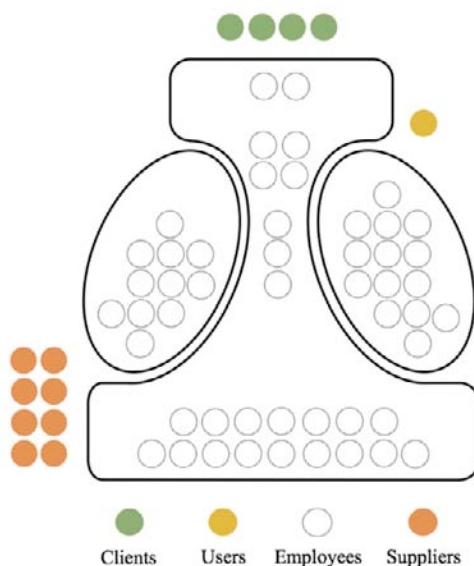

FIG. 6. WHO DO DESIGNERS COMMUNICATE WITH?

Clients Users Employees Suppliers

in the development of their companies. I also tried to find out why so few designers enter the manufacturing sector. All of these companies developed products; two of them employed industrial designers. All were exporters. The MDEIE's "Enquête sur la perception et l'utilisation du design industriel par les entreprises manufacturières québécoises" (Abdel-Malak & Brassard, 2008) reveals that only 5% of companies in some manufacturing sectors[4] employ at least one industrial designer full-time and that 9% do business with consultants. It is therefore not surprising that our interlocutors employed few industrial designers. Nevertheless, all the executives I interviewed had an idea of what industrial designers do and do not do. Only one of them employed an industrial designer whose function was to develop products.

For some, the role of designer is reduced to giving form to a product. For many small manufacturers, this sole utility, while necessary, is not sufficient to hire a designer. Indirectly, these statements are consistent with another idea. One participant spoke of the additional specialization required of designers: "We must supplement the training of designers".

The desire for teamwork, and opposition to recognizing creative authorship, were often repeated, sometimes directly, sometimes indirectly. "Designers must be team players. They must integrate the ideas of others, without excluding their own." "Designers cannot design products alone."

When I asked these individuals who in their companies were the bearers of the creative projects, all responded that they were, or they and their team. All perceived innovation and product development as important and central activities of the company. Nevertheless, they did not confuse the concepts of creativity and innovation; they are not equivalent. Furthermore, for them, innovation and product development are never the result of a single professional or a single profession, and the real creative project is, above all, the company, its formation, its growth, and its preservation.

In conducting the study, I noted discrepancies between the values and beliefs of the companies and those specific to design culture. The following are some tangible manifestations of these discrepancies:

· the company, far more than the product, is the creative project in the manufacturing sector;
· the flow of products, more than the product itself, is the focal point of product development;
· the practice of industrial design in this sector is often more operational than is suggested by professional discourse;
· much of the work of industrial designers is related to the continuous improvement of products, a rather discrete aspect of their professional activity;

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[4] The sectors covered by this study include manufacturing of wood products, plastics and rubber, non-metallic mineral products, metal products, machinery, electronics, electrical equipment and components, transportation equipment, furniture and related products, and miscellaneous products. In 2009, these represented 41.7% of shipments and 57% of salaries in the manufacturing sector. Compared to primary processing sectors, they generated more jobs.

· creativity and innovation have a more collective and broader meaning in the manufacturing sector than they do in consulting firms or design schools;
· among manufacturing firms, "customer satisfaction" is one of the most important values;
· during their training and in consultancies, designers work in much smaller and more homogeneous groups than they do in the manufacturing sector;
· design students are exposed to few models from the manufacturing sector;
· the methods used in university workshops replicate those used in the professional services sector and bear less resemblance to those current in the manufacturing company.

DISCUSSION

Whether specialized or not, the higher the level of education that industrial designers have, the less they are likely to be employed in the manufacturing sector. While the impact of university training is not clear on whether there is a causal link between the duration and level of training and the lower penetration rate of graduates in the manufacturing sector, the question certainly merits discussion.

Design acculturation and dominant design culture

As a professional group, designers share a common culture. This culture is acquired in their early studies and develops throughout their working lives. Acculturation occurs particularly in and by educational institutions, the media, and professional associations. I will discuss, in turn, the contribution of these institutions to the development and transmission of design culture.

Educational institutions

Today, becoming a designer usually means studying design in an educational institution at the college or university level. This path, lasting three or four years, sometimes more, is instrumental in the acquisition of professional culture. Design culture is acquired and superimposed over the students' personal, family, and national cultures. During their studies, future designers bond with a community of common interests, their classmates. Together, they carry out design projects, discuss, and have unifying social experiences, for example, design charettes.

Projects represent half the curriculum of design schools. Design projects replicate those conducted in consulting firms: students are given a topic and a line of research. Problems are analysed, for the most part, virtually. Competitive products are analysed in the form of photographs or images. The commercial, social, manufacturing, and technological contexts are more inferred than observed. From there, within the cultural group, solutions are proposed, modelled, and presented. For a given problem, several solutions are hypothesized. One of these is selected, argued, and defended in presentations. The process ends more or less here. It is detached from other trades and professions involved in product

development. The hypotheses are almost never verified or validated. They are certainly considered, but in light of aesthetic values, and in an idealized world. As students progress through their studies, fewer projects are completed in teams. Traditionally, in university design programmes, the final project is a "personal" project.

Through theoretical instruction, students share the myths, i.e., the stories (sometimes fantastic or exaggerated) of the origins of their practice ‑ Bauhaus, the industrial revolution, and in the case of Quebec, the myth of Europe as the Eden of design. In methodology courses, students are exposed to methods of working that are often oriented toward the client, the user, and social needs (which I did not observe in practice). The result is a social justification of professional practice. Gradually, a picture is built of what design is and what it can be. The beginning of a transfer of identity to the group and to the profession is thus recognizable.

Professors and teachers represent meaningful models for the students. With the development of design education at the graduate level, teachers come directly from the university milieu. Their design culture is more intellectual and less practice‑based. This is a good thing. Theory and research are now better articulated in design education. Instructors are increasingly graduate students. As for those who come from practice, they are nearly all from the professional services sector, rarely from manufacturing. The models to whom designers are exposed are thus primarily academics and practitioners in consultancies. Students have very few models from the manufacturing sector.[5]

Media

Designers read the same magazines, follow the same news, attend the same conferences. They have dedicated websites and information networks. Over the years, a fully grown media industry has developed in design. The media feed on news. Each piece of news is short‑lived. Interest in a story, the "storytelling", becomes as important as the subject itself. The mediatization of products is based, as such, on the criteria of novelty and the related story. In other words, it is not entirely necessary to have a product behind the story. An image of a product, a prototype, a unique object suffice. In any case, it is now difficult to distinguish between an image and a product. This explains why and how, from a media point of view, virtual images feed the thoughts and perceptions of designers. Over time, designers are subject to a surface vision of the object. Apprehending the world of exchange (exchange of work, exchange of goods) is often removed in the media.

Designers who practice in consulting firms have great interest in seeing their work published frequently. It is a form of advertising for their services and contributes to recognition by their peers. Many designers in this sector publish projects that will not be used by their clients or were created for purely experimental purposes. Design schools also know that

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[5] At the École de design at the Université de Montréal, for example, two instructors out of more than 50 were from the manufacturing sector.

fun, bold, or forward-thinking projects easily attract media attention. This is rarely the case for the manufacturing sector, which, on the contrary, seeks to silence products that fail in the marketplace or whose development is abandoned. Famous designers, the heroes of design culture, come more often from the professional services sector. The rule in manu- facturing firms is that the publishing of projects, the public representation of products, is the responsibility of management. In addition, the industrial designer is rarely the focus of the story for manufacturers. When it does happen, it is often in fashion-related industries.

Profession

Spokespersons defend the interests of the design community and represent it in the public sphere. In Quebec, the Association des designers industriels du Quebec (ADIQ) and, more recently, Mission design, an advocacy and coordinating organization, act in this capacity. In recent years, ADIQ has made remarkable efforts to increase its membership and its representativeness of the industrial design community. Despite these commendable efforts, ADIQ remains significantly under-representative of designers in the manufacturing sector. Its lobbying and promotional activities are inevitably coloured by the concerns of its members. Its website, for example, shows images of the work of its members, which nearly all come from the professional services sector.

The most important professional acculturation factor, however, does not lie within these organizations. Employers, immediate supervisors, and bosses have much influence, like teachers, on the transmission of the characteristics of the profession. In consultancies, boss- es devote time to coaching newcomers to share their vision of design and their expertise, until the newcomers learn the ways of the firm. In manufacturing companies where a professional mentor already exists, the transmission of the ways of doing business, the pro- fessional credo and values of the company, is similar.

Despite a majority of designers working in the manufacturing sector, the dominant culture of industrial design in Quebec is that of the professional services sector. The values and beliefs that characterize this design culture are numerous. In *Ideas and Beliefs in Architecture and Industrial Design*, Ivar Holm (2006) provides a comprehensive description of these val- ues and beliefs. I will not name them all, but those I have selected are frequently part of the dominant professional discourse: creativity, expertise, aesthetics, modernity, originality, and professionalism.

Shared values?

Like designers, companies have a culture; it lies in the managers and employees, and re- flects, in part, the values of the communities in which the companies operate.

Valeurscorporate.fr publishes a list of top corporate values in the world. These values are used in entrepreneurial discourse and should be understood as an idealization of compa- nies: quality, innovation, customer satisfaction, integrity, the environment, social respon-

sibility, success, expertise, responsibility, teamwork, and respect.

These two cultures, design and business, are different; they are not irreconcilable, however. Many of the values of these cultural groups are shared or similar. Design relates to individuality by both modernity and the meaning given to creativity. Entrepreneurs adhere easily to these concepts. In their companies, however, they must promote teamwork and innovation to motivate others to embrace their projects.

Success is an essentially conquering value; it implies the creation of wealth. Some associate the creation of wealth and its concentration to social inequality. Recognition and appreciation are also part of success, and these values do not appear to be rejected by designers. Furthermore, the commercial success of a product is an indicator of democratic choice. One might ask what division of success seems acceptable to designers.

Neither designers nor entrepreneurs are scientists, yet they recognize expertise. They possess know-how and they value it. Both cultural groups cite either creativity or innovation as core values. While creativity may seem to have an almost fortuitous nature (more psychological than social), innovation is necessarily relative to everything that exists and is ultimately collective. This issue is central to many misunderstandings. Wherein lies creativity, and wherein lies innovation? In the group or in individuals? For companies, such questions have little importance; what matters is being able to integrate innovation and to profit from it.

Customer satisfaction is an essential value for companies. The notion of the customer is central to the definition of companies, which are socio-economic organizations set up to carry out exchanges with customers. The relationship between the design profession and customers, however, seems more ambiguous. This ambiguity cannot be resolved if the relationship is not mutually beneficial and respectful; this is the very basis of social and business relationships. Without these two conditions, the area of practice that designers legitimately claim will be occupied by others.

CONCLUSION

This study finds a relatively low penetration rate of university-trained industrial designers in the manufacturing sector in Quebec. This finding is not positive since it corresponds to a missed opportunity. With university cohorts totalling around 150 individuals per year, not all graduates are able to find jobs in other sectors of the economy. Designers trained in Quebec universities enter the manufacturing sector less frequently than they could. Industrial design consultancies, on the other hand, have limited space. The vacuum is filled by other designers. This should concern the design community. One wonders if it is because industrial designers do not want to work in this area or because employers do not recognize in these graduates the industrial designers they seek to hire. Whether for either of these reasons, and it is probably a combination of both, the effect, in terms of professional practice, is the same: the utilization rate of industrial

designers who have a university education is less than what it could be, and industrial designer jobs are occupied by individuals with other training.

One also wonders whether this is a purely local phenomenon or whether it is generalized. I invite others to examine their own environments to determine what is local and what is more generalizable. As with all cultural issues, it is risky to generalize from what one observes in a group or community without multiplying the observations.

In this study, the quantitative data, observations, and interviews reveal a number of differences between the dominant professional discourse and practice in manufacturing firms, and between the perception of clients and practitioners. These differences or divergences are normal and common to all professional practices. I have shown that these discrepancies lie, in large part, in the cultural differences that characterize the manufacturing sector and designers in Quebec. I note that the dominant design culture is that of practice in the professional services sector and that it is reinforced and transmitted by university design education. I regret that in Quebec, the values of this culture are often in contradiction with those of manufacturing companies. To answer the questions in the title, "Who should change what, and how?" I advocate for better alignment of design education with the plurality of practices in industrial design, and for openness to otherness.

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LATIN DESIGN FICTION

Bruce Sterling[1]

Barriers to entry are collapsing between creative disciplines. This has profound implica-tions for Latin design. A few examples: Dario Tonani, a Milanese science-fiction writer who also curates photographs on Flickr. These photographs are thematically related to his written work, but created by people he has never met. Bogota has cyberpunk techno musicians whose work centres around costumes and club performances rather than music alone. Tijuana has a "Tijuana Liberation Front" - students of futurism creating street interventions with costumes and fake devices from the "Future of Mexico". Brazil has a "Sociedade Retrofuturista" whose participants recreate scenarios from the past and the future without distinguishing between the two.

Activities of this kind are harbingers of change. Network societies behave in this newly eclectic way. New means of production are empowered by search engines and social me-dia. Creative eclecticism is a side-effect of modern digital media and its nonlinear, rhizo-matic methods of diffusing information. Creative people find themselves following the new capacities of their machines. Creative efforts within network society do not have to "really exist" in order to be successful. Such efforts are commonly virally spread as files experienced through screens. A file on the screen becomes the basic deliverable element - the "actual" object or service is created-on-demand.

Therefore, although "Latin design" in the past commonly connoted a creative effort in some specific locale in some Latin country, on a network, it is more likely to be identified as "Latin" through the use of a Latin language, set design, costumes and cultural manner-isms. Looking and behaving "Latin" on YouTube may be more effective than actually being Latin.

In a network society, prototypes are actualized only when demonstrable demand exists. Products are instantiated, and peripheral to the activity of the network. It is no longer a simple matter of whether a product "actually exists" or is merely "conjectural" or "proto-typical". These are no longer absolute distinctions.

The following list demonstrates that a great many socially important products - real crea-tions of human genius - do not formally "exist". Yet they are important; from the perspective of Latin design, they offer interesting new opportunities in the projection of "soft power":

[1] Writer and journalist.

· holy relics, attributes of sainthood and divinity; transubstantiated Hosts, Arks of Covenant, teeth of Buddha, trident of Shiva;
· supernatural objects and services associated with elves, vampires, fairies; magical charms, garlic, silver bullets;
· new age crystals, lucky charms, protective pendants, mojo hands, voodoo dolls, magic wands, quack devices, medical hoaxes;
· fantasy "objects" in fantasy cinema and computer-games;
· physically impossible sci-fi literary devices: time machines, humanoid robots;
· perpetual motion machines; free-energy gizmos, other physically impossible engineering fantasies; state libels, black propaganda, military ruses; missile gaps, vengeance weapons, Star Wars Strategic Defense Initiative;
· "realplay" services, "experiential futurism" encounters, military and emergency training drills, props and immersive set-design, scripted personas;
· online role-playing scenario games;
· net.art interventions, diegetic performance art, provocative device-art scandals;
· guerrilla street-theatre; costumes, puppets, banners, songs, lynchings-in-effigy, mock trials, mass set-designed Nuremberg rallies, propaganda trains;
· fake products, product forgeries, theft-of-services, con-schemes, 419 frauds, for-profit frauds and false commercial advertising;
· Rube Goldberg and Heath Robinson devices, chindogu "unuseless objects", parodies, whimsies and comical contraptions; Albert Robida satirical prognostications;
· vaporware; "Fear Uncertainty and Doubt" public-relations campaigns;
· "design fiction" diegetic prototypes from sci-fi media, "concept cars", "conversation pieces", provocative laboratory curiosities;
· blue-skying internet-based "theory objects" and congealed techie pundit scuttlebutt; socially-generated rumour and tech speculation; crowd-sourced speculative objects and services; kickstarter projects;
· "brand management" by design;
· design pitches to the board of directors; untested business models;
· the plans and schematics for as-yet-unborn yet genuine objects and services, real-life product descriptions and users instruction manuals, product reviews and opinions; user feedback, public assessments, design criticism, material-culture assessments, scholarly studies, legal regulations and government protocols concerning objects and services;
· engineering specifications, software code;
· historical tech assessment of extinct technologies, the "judgement of history";
· the ideal and unobtainable "objective truth" about "real" objects and services.

DESIGNING FROM THE EXTERIORITY OF THE PROJECT

Paulo Reyes[1]

This paper explores the outcomes of a research work that was aimed at investigating methodological processes on design. The premise explored in the study is that a design exercise is an open process, that could lead to unpredicted actions in the rational initial definition of its aims. Thus, all and every event, external to the initial design problem, must be taken into account as a constitutive element of this same design problem. In the development of this idea, the design problem is seen through a literature review of Simon, Schön and Cross' works, in order to develop, from Morin and the "Italian studies", the concept of *exteriority* in design. This idea was developed during empirical studies held at the Design School at University do Vale do Rio dos Sinos in Porto Alegre, Brazil.

••• Design; creative process; teaching •••

INITIAL CONSIDERATIONS

This article is the outcome of a research work investigating methodological processes in design. Design is here looked at as a way of solving problems in time and space. This process of problem solving has been studied by several theorists through different epistemologies. The present study approaches the problem through three diachronic moments in the history of the project, represented by the following theoretical frameworks: Herbert Simon (1969), Donald Schön (1983) and Italian studies in the last 10 years.

The thesis faced here is that the design process is open and subject to hazards not covered by the rational definition of its initial objectives. From this perspective, any event or factor, external to the initial design problem, should be considered as part of what defines the project.

For the purpose of this article, a logical reading was built up that guides the thinking through the design process, based on the following ideas: *anteriority*, when the project is considered an early resolution to problems from the perspective of optimization of results; *interiority*, when the project is thought through the process as a way of thinking within the action itself; and *externality*, when the project is designed as an open process in a system perspective. These three perspectives were approximated to the theoretical references al-

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ready mentioned; the problem is constructing the definition previous to the *corpus* study ⁄ Simon; the perspective of interiority ⁄ Schön; or by external interference to the *corpus* ⁄ Italian studies.

The objective of this paper is to propose a design method that considers relevant aspects of these theories and opens up to a broader view of design. The theoretical model has been tested and is in permanent review through teaching and research at different levels, gradu⁄ ate, undergraduate, extension, and private consultancy.

This paper is set up in four parts: the first part presents a theoretical review of the design concept in Simon and Schön; in the second part, we present the design problem in the contemporary context; the third part delves into the concept of *externality* in design sup⁄ ported by the thinking of Edgar Morin (1990) and the concept of metadesign coming from Italian studies; and the fourth part presents the case study of one exercise at the Design undergraduate course of the Escola de Design ⁄ Unisinos in Porto Alegre, Brazil, in 2011.

DESIGN IN FOCUS: A HISTORICAL PERSPECTIVE

On principle, it is considered that design is a complex process of anticipating the future, and the field that organizes this knowledge is internationally known as design. The end product is a meaning rich in concept and therefore problematic. In order to recover the orig⁄ inal meaning of the word, we take the concept from Vilém Flusser (1999, 2007) to position design as a project and plan, both as outcome and process, going beyond representation.

This research is affiliated to a line of thought that examines the design process as a creative and exploratory problem⁄solving exercise through analysis⁄synthesis⁄evaluation focused on the solution. This is no simple or linear research. It serves as a systemic process that varies from constant movements from problem to solution and solution to problem, sup⁄ ported by appositional and abductive thinking. In this sense, the development of the pro⁄ ject is often erratic and non⁄linear.

The issue is not new and appears strongly in studies in the United States in Simon's *The Sciences of the Artificial* (1969) and Schön's *The Reflective Practioner* (1983). In Simon (1981), the design process is strongly marked by rationality already posed in the definition of the problem.

Simon seems to forget that projectual action does not occur through confidence, but the operational capabilities that occur throughout the design process. The idea of "prior objec⁄ tive" removes the subject from his own projectual action, repositioning him in the anteri⁄ ority of the project. That is, design is considered as a way to resolve all possible setbacks in a predetermined way in the construction of the problem. In search of an "optimization method", Simon builds the accuracy of the results with total control of all possible alterna⁄ tives in the process.

Unlike Simon, Schön believes that the design process cannot be defined prior to the pro⁄ cess ⁄ anteriority ⁄ but through the construction of the problem throughout the process

⸌ interiority. Schön concentrates his focus on the interiority of the design process already positioned as a problematic situation, as in the "problem of problem definition is not well⸌ defined" (Schön, 2000, 16).

In the design process there is a dimension of uncertainty that is defined almost as a "black box" of difficult access to rationales and procedures. Schön defines it as a kind of compe⸌ tence that is sourced from unique situations, uncertain and conflicting. This means that this kind of knowledge does not depend on our ability to describe what we do, making conscious what our actions reveal. For him, "think what I am doing 'does not mean' the same as thinking what to do and do it" (Schön, 2000, 29). As the basis of his whole theory, reflection⸌in⸌action is a type of learning process that operates on trial and error. Thus, from a tacit knowledge, totally dominated, we turn to situations where the routine knowledge is not sufficient to solve the problems that arise.

DESIGN IN FOCUS: THE CONTEMPORARY DEBATE

Later, the studies on the design process pointed out by Simon (1969) and Schön (1983) were further advanced at the Massachusetts Institute of Technology (MIT) and broadly published on *Design Issues* (since 1984), a journal focused on design processes. Parallel to the studies of Schön, there was another research group lead by Nigel Cross, based at the Open University, in England. In order to disseminate knowledge in the field, in 1979, Cross created *Design Studies*.

Unlike Simon who seeks in science the epistemological status of design, Cross (2010, 2) proposes a position between the world of science and arts (humanities). He seeks to under⸌ stand the nature of design activities that could support and develop, with robustness and independence of science or the arts, the discipline of design.

While science has its focus in the natural world and humanities in the human experi⸌ ence, design would concentrate in the artificial world. To each area corresponds a way of researching reality. In science, method is a procedure of control through experiments, clas⸌ sification and analysis. For humanities, it is in assessment through analogy and metaphor. For design, knowledge is achieved through modelling for pattern formation and synthesis. So, if there is a way for these cultures to be scientific or artistic, there would also be a way for the design activity, to introduce a "designerly ways of knowing" (Cross, 2010).

This paper argues that this "designerly way of knowing" occurs in design practices that understand the design process as an open field and subject to change at any time outside the process itself, often in unexpected ways, that means, the exteriority of the project.

Although Cross does not explain the ability of the designer to understand the project, that can be implied from his theoretical constructs. He defines the ability of the designer as the capability of "solving ill⸌defined problems, adopting solutions focused on cognitive strate⸌ gies, using an abductive or appositional thinking and using means of nonverbal com⸌ munication modelling" (Cross, 2010, VI). This way of constructing a problem, from

an appositional situation, allows for a sort of "erratic" search for a solution. That is, the simultaneous construction of possible solutions, operating through contradiction and not by certainty, as is the main argument in this paper.

In the same direction are Dorst & Lawson (2009), Francesco Zurlo (2010), Celaschi & Deserti (2007). They consider that the term design is a confusing and often misused one because of its multifaceted nature. The word design is hardly used in a single direction, without losing something important. If there is a possible definition of the term, this can be done through the point of view. That means multifaceted thinking or "seeing as". It is in "seeing as" that we can fixate the meaning of design. And it is this sense of "seeing as" which maintains that the project perspective comes through the attention to what occurs outside the project, the exteriority.

In Zurlo (2010), the designer develops the ability to "see", understood as oriented reading of contexts and systems; to "foresee", understood as a critical anticipation of the future; and to "make see", as the ability to visualize future scenarios. For Celaschi & Deserti (2007), seeing design is expressed in the organization of a reflective phase that occurs in the design process. This phase is the idealization and the programming of research and projecting.

Design as a "problem solving process" is a process of solution problems by proxy. That is to understand the process as a construction of hypotheses to be tested not to solve the problem, but to increase their level of complexity. In this kind of clouded state of problems, the choice of path may be given in a process of "fixing" (Jansson & Smith, 1991) the problem by defining a *vision* of the project (Celaschi & Deserti, 2007).

Thus, for Lawson & Dorst (2009, 38), the problem solving process "is not a matter of solving the problem first and then making a creative leap to a solution", but a process going forward together, both in the formulation of a problem and the ideas for a solution in a constant back-and-forth movement. The problem-solution pair is a step that involves a lot of instability until there is a *vision* that fixates the problem.

DESIGN FOCUSED ON EXTERIORITY

Returning to the initial thesis that the design process is open and subject to hazards not covered in the definition of initial goals, we seek in Morin the theoretical underpinning for this argument. Morin thinks of the project as an action strategically developed over time, under external influence throughout. For Morin (2005) strategy is action. He defines it as not a "determined program to be applied without change in time". Instead, strategy provides a means of early vision that "provides a number of scenarios for action, scenarios that can be modified according to the information to come into the course of action and chance to succeed and disrupt the action" (Morin, 2005, 79). It is worth reinforcing some questions: scenarios that "might" be changed, "events" that will happen and "disturb" the action.

With Morin, an open system in constant transformation is pointed out. Unlike Simon, not always determined, it is open to chance and error; also in contrast with Schön, the

action is not only open to chance, as it should be in constant friction with the external disturbances. Morin points to a vision that focuses on projective externality as action. Action cannot be seen as independent from the system. Any action in any field can only be described from the viewpoint of the system. Thus, the system presupposes one internal and another external space in which the action is the act of articulation.

In this line, one can argue that action serves as external disturbance to an otherwise balanced system. Therefore, any model representing reality must provide mechanisms for entry and exit as to retrofit the system within the paradox of stability and disturbance. Action in the system should establish a relationship between environment and system, contributing to the notion of open system.

In this direction we find the Italian studies of Zurlo, Flaviano Celaschi, Alessandro Deserti, Ezio Manzini, Anna Meroni and Dijon De Moraes, among other researchers at the Polytechnic of Milan. These studies support a vision of the project triggered from the construction of a reflexive phase of the project called "metadesign".

The metadesign is a preliminary stage of the project that is presented as reflection on the project itself. Unlike the design phase, it has no "output as a unique model and predefined technical solutions, but a complex, articulate system of previous knowledge serving as guide through the design process" (De Moraes, 2010, 25). According to Celaschi (2007, 40), in this phase the "agreed pact" between mediators and client takes place and dimensions and qualities of the problem to be solved are established: timeframe, resources, methods, actors, control system.

Therefore, metadesign takes shape as a knowledge platform to aid the decision process on future scenarios of uncertain, dynamic and fluid nature, as shown in Figure 1.
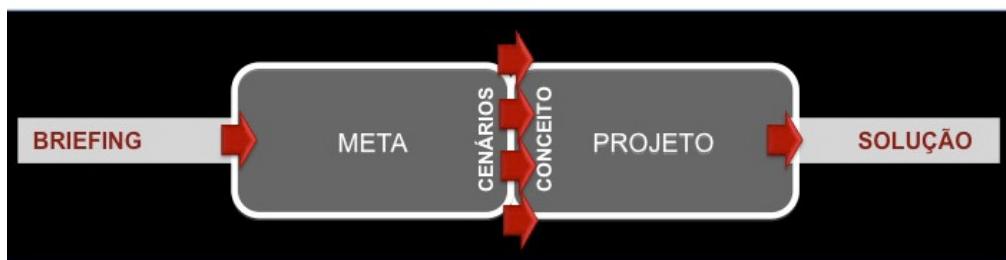

FIG. 1. METADESIGN AS A PLATFORM OF KNOWLEDGE PREVIOUS TO DESIGN PHASE. SOURCE: AUTHOR.

However, if we consider the project as a process strained by external actions, we can understand metadesign as a process reverberating on the project permanently, not only in a preliminary stage. It is in this conception ⁄ of action external to the project ⁄ that this article discusses metadesign.

A LEARNING EXPERIENCE THROUGH EXTERIORITY

The experience reported here is the outcome of a five months' exercise developed in the second half of 2011 in *Projeto 2* at the Escola de Design at the Universidade do Vale do Rio dos Sinos in Porto Alegre, Brazil. The course was conducted in partnership with Carlo Franzato, Ph.D. and the master's students Gilvani Norenberg, Patricia Hindrichson and Ricardo Pletes. The theme of the assignment was the development of a system or group of products to be used by a designer. Students had to develop products using the technology of precast.

The theoretical perspective of the Escola de Design is strategic design. That is, design is always seen as a broad and complex system beyond the object. The methodology considers metadesign as a possibility of extending the construction of the design problem. Students use the metadesign phase as a series of steps that must be developed to obtain the knowledge of the reality proposed. The analysis revolves around the client/company reality, the market, technology available, user context and trends of innovation.

However, it appears that most of the time students undertake the research phase as a bureaucratic task, as an obligation. This creates an imbalance in the design process as a whole. Which means a phase of research (metadesign) and another of design. Another problem concerns the time spent in relation to the metadesign and the design phase. The student dedicates threequarters of the time to metadesign resulting and a quarter of the time for the design. This results in a strongly conceptual design technically underdeveloped.

Thus, we may say that instead of thinking of metadesign as a series of tools or steps of survey data, it can be thought of as a projective action that occurs along the process as a "seam" external to the process, as shown in Figure 2.
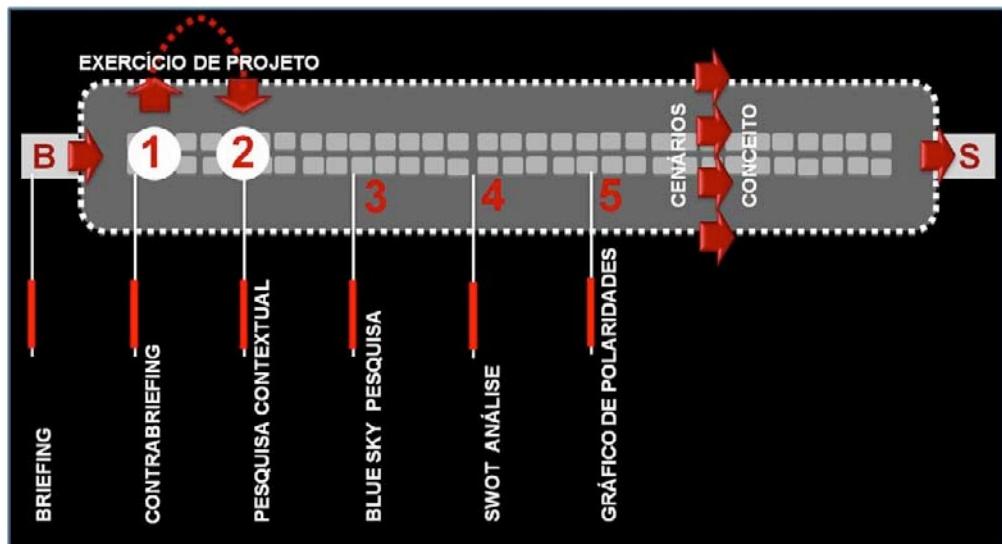

FIG. 2. METADESIGN AS EXTERIORITY OF THE PROJECT. SOURCE: AUTHOR.

The problem to be faced is a problem of a methodological nature: how to turn the meta-design phase into effective design action? How to expand the metadesign phase beyond a knowledge platform?

The first response and challenge posed were to transform the metadesign stage into a design double, turning it into a permanent reflection through the project. That is, as design, not as a preliminary stage, but as a permanent tension within the project. The challenge was how to construct an external look to the problem and at the same time organize the project, as shown in Figure 3.
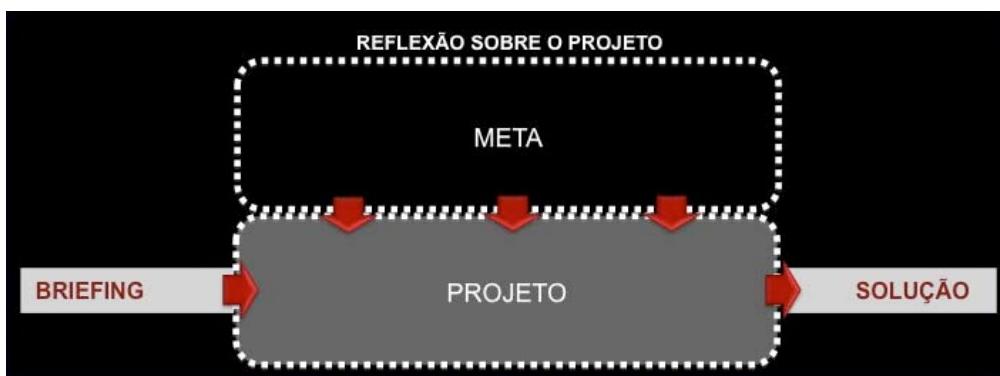

FIG. 3. METADESIGN AS A REFLEX ACTION EXTERNAL TO THE PROJECT. SOURCE: AUTHOR.

We took the decision of defining the survey stage as an exercise of design reasoning. This means making a project reflection-outside-action, and not as in Schön's reflection-within-action.

The first task was to discuss with students the concept of a family or system of objects. The challenge was to turn this discussion into a projective action and not a theoretical discussion on reference literature. Instead of presenting the theory and then working out the project, we did the opposite. First the students designed and then they expanded the debate on the texts.

In order to develop the reasoning on the project, we built a signifier without any apparent meaning, and asked them to develop the project of such a meaning. The given significant was named: Schillon. We were careful to use a word that did not have a meaning in any language.

In seeking to understand what Schillon was, the students constructed its meaning through free association. To give the "object" some meaning, they built reports that organized and gave it consistency. The results offered were the most diverse, from services to objects, rituals and so on. For us, the level of reality of the construction was less relevant than the definition of the projective path they built.

To get to the concept of a family or system of objects, we moved on in the exercise. The students were asked to design Schillen. That was to be an object directly related to the previous object, the Shillon. This construction of the Schillon and the Schillen forced students to build a reasoning on the design that would bring sense to the objects created and consequently to understand what a family or system of objects meant.

This exercise lasted for a week (two meetings). After that we returned to the concept of system, relating it to their design efforts. However, their understanding of the theory was not an easy task. Instead of weighing up the theory, we chose to propose a new unplanned exercise. We asked them to go outside and each pick up leaves from different trees. On their return they were asked to classify those leaves by common features, based on their own judgement and sensibility, with no theoretical framework. The results are shown below in Figure 4.

FIG. 4. ORGANIZATION OF COMPOSITIONAL SHEETS PER FAMILY. SOURCE: AUTHOR.
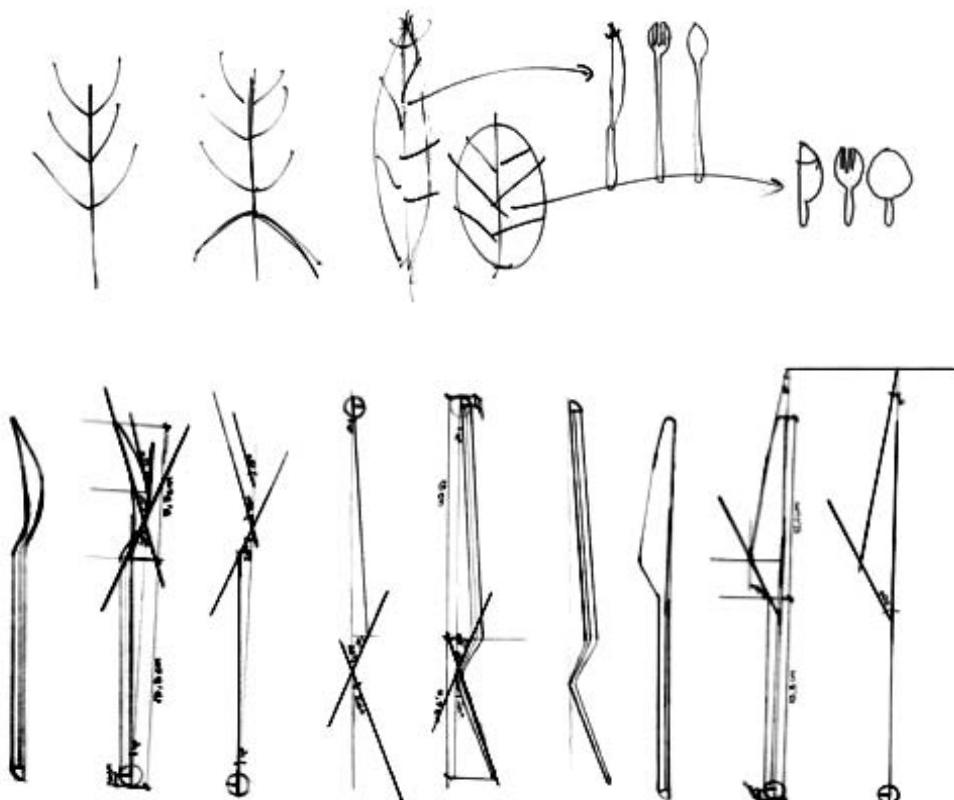
FIG. 5. GRAPHIC RECORDS OF COMPOSITIONAL SYSTEMS. SOURCE: AUTHOR.

From ordering by physical similarity, we asked them to identify the compositional structure of the leaves through drawings, as shown in Figure 5. Based on these drawings, they were asked to design a set of objects ⁄ cutlery. The goal was to understand the relationship, which existed in objects of the same compositional system (Fig. 5).

Continuing the design process, we realized that during the creative action, students were more concerned about *performance* and expected result, seeking rapid responses to problems that arose, setting aside any more elaborate thought. The way out of the problem was to recognize that some design strategies previously organized by teachers were effective, leading to frustration among students.

Returning to the original thesis, that design is organized outside the process, we acknowledged that this frustration was to be taken as a moment of "collapse" that must occur within the process. The design process cannot be seen as linear and efficient in every step. Rather, it is a fraught process with difficulties and small momentary breakdowns. Figure 6, below, represents this design process, illustrating the proposed exercises as external events, not predicted to the project.
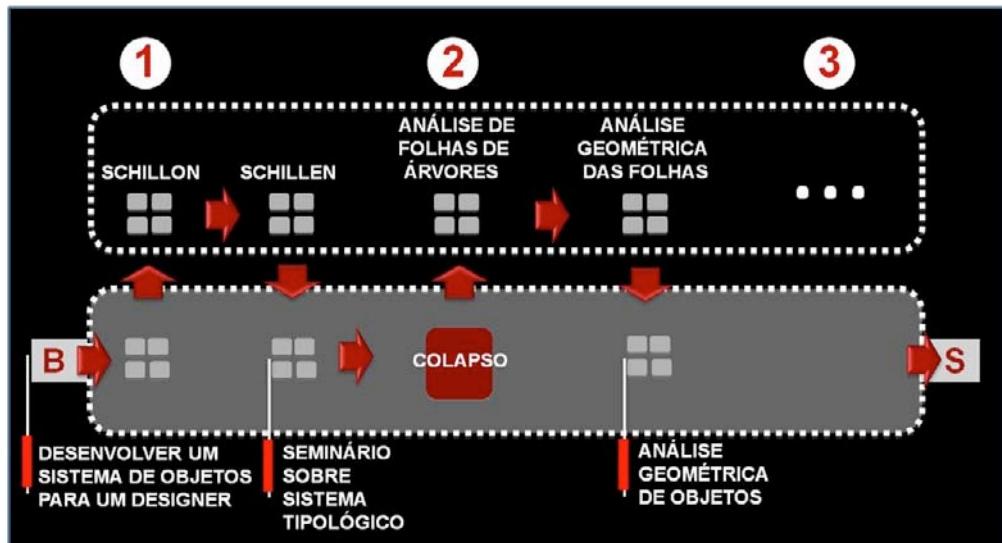
FIG. 6. GRAPHICALLY ILLUSTRATES THE PROCEDURES ADOPTED. SOURCE: AUTHOR.

FINAL CONSIDERATIONS

The method developed here understands reality as something that cannot be entirely grasped, stating that the apprehension of the object of study is always an approximation. By not being totalizing, we do not mean it to be superficial; instead, the method allows for a feeding process, while maintaining the open character, building stability with external interference through the imbalance of the system. In the development of this method we were cautious to predict some escape routes from the identification of the breakdown moments, as shown in Figure 7.
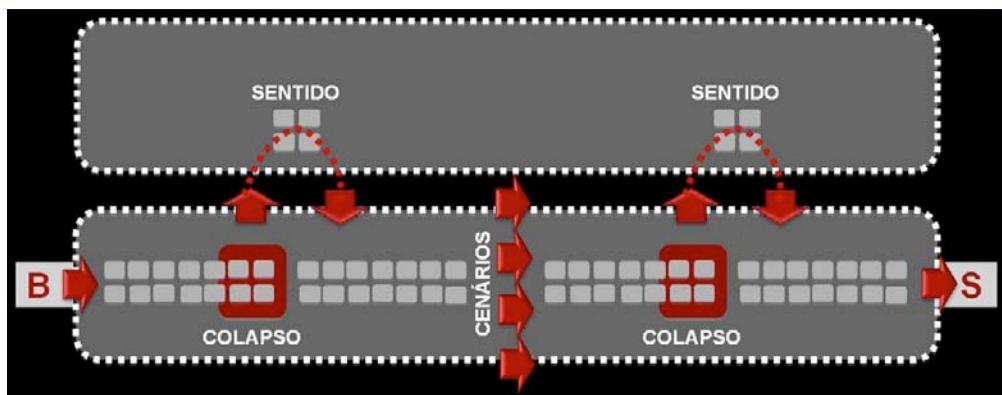

FIG. 7. GRAPHICALLY ILLUSTRATES THE PROCEDURES. SOURCE: AUTHOR.

When relating the theory reviewed (Simon, Schön, Morin) to the thesis developed throughout this article, we established that the different ways to approach the project are characterized by different "design dimensions". It may also be noted that these design dimensions are organized by levels of complexity.

At level 1, which we call anteriority, the entire project serves one purpose in the sense of efficiency and optimization of processes, clearly maintaining the relationship between the object and its external relations. At this level, we approached Simon.

At level 2, which we call interiority, all the projective action is reflexive, where the meaning of the project is in the reflection. At this level, we approached Schön.

At level 3, which we call exteriority, the entire project responds to a goal, but that goal is not fixed. It is a reflexive act, but above all, it is a reflection out of action as tension. At this level, we approached Morin and argue that the reflection can be tensioned by the intuitive act, and that the definition of the project occurs between the identification of the breakdown at a rational level and free association in the imaginary level.

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DESIGN SCHOOLS: FROM CREATION TO MANAGEMENT, FROM MANAGEMENT TO A NEW ENTREPRENEURSHIP

Christian Guellerin[1]

Given the turbulent socio-economic climate, the number of remarkable opportunities awaiting design schools is not only impressive, involving the training of students who will occupy tomorrow's top managerial roles, but also commensurate with innovation challenges facing businesses and society on the whole.

In the past decade, they have already undergone a lot of changes, and are the focal point in several countries. That said, their evolution is not over: They will lay the groundwork for "centres of innovation" aimed at serving the financial front, and, on a more general note, society.

Two factors forced some schools to move toward more professionalization. One was the awareness that design, creation and innovation were a superb engine of growth and development for businesses. The other, new to the field of design education, was the requirement that an institution was not to judge itself based only on the quality of its graduation projects, but rather on the quality of job opportunities found by students.

Thus, the era of "entrepreneurship" is in motion. The more viable projects are, the more tempted students will be to develop them, and will not give others the chance to do so in their place. A new quality criterion will be implemented for the most efficient creation venues. The percentage of students who start their own business based on products they devised during their studies will be decisive. The more relevant the innovation approaches are, the more convincing students will have to be by "taking the plunge" into the world of self-employment.

DESIGN SCHOOLS, FROM CREATION TO INNOVATION. THE CONDITIONS FOR A NEW ENTREPRENEURSHIP

A "discipline of creation", design is being incorporated more and more into the tactical and strategic thought and planning processes of the corporate world. With marked applications and challenges on all socio-economic fronts, it has, also, become a "management discipline". Donning notoriety greatly attributed to their students' creativity, design schools

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have at their disposal infinite opportunities to become "centres of innovation" needed by France and Western countries on the whole to rethink re-industrialization of our Western economies. Representing a united front involving use cases and "future lifestyles", they gather together a variety of individuals from seemingly opposing fields, including engineers, the marketing-minded, philosophers, sociologists, artists and designers... all of those who are interested in devising a society more conducive to growth and self-fulfilment. Seated at the crossroads between technology, economics and social sciences, their strategic situation enables them to chime as one, and unite the most suitable development scenarios. Design schools will, no doubt, play an integral role in revealing the innovative solutions of tomorrow. Design schools could, ultimately, benefit from relevant assets of representation at the same time as "Designed by" replaces "Made in" in the delightfully delectable competition of which our economies partake.

A DESIGN - CREATION - AND INNOVATION-FRIENDLY CONTEXT

Economic and industrial models are crumbling. Economists everywhere seem incapable of not only predicting, but solving problems facing today's Western countries. The reality is that universities of economics, recently recognized by the Shanghai ranking for the quality of their research, have not turned out the "finders", who alongside researchers, are expected to provide solutions to calm the stormy seas that lie ahead.

Moreover, the exact and objective science that is technology, which once put its trust in humanity-based progress, has gone so far in its quest for the "knowledge of things" that it has, at the same time, managed to spread panic by objectifying progress and the end of the world. GMOs, genetic decoding, atoms, etc. so many topics on which the all-knowing powers-that-be astound and threaten us with the best and worst of scenarios.

Globalization, internationalization, the intermingling of populations and cultures challenge our cultural references of value and meaning. Morals take a backseat to the law as our notions of right and wrong, freedom, justice, respect of nature, others and ourselves, manners, etc. are thrown out of whack as a result of different cultural approaches.

These shifting contexts are particularly favourable to design. In the face of fear conjured up by tomorrow, there is a yearning for values, meaning, and on a greater level, hope, a future. It is as if it were necessary to find spirituality, including objects found in the day-to-day. The popularity of interior decorating bears witness to this "semi-pantheistic" approach, whose credo feasts on wanting to find meaning even in the most trivial of objects such as a "teaspoon".

In the same way, because we feel an overwhelming sense of standardization resulting from globalization, we prod ourselves to uncover a sense of identity. With an attachment to products and brands, the concept of "Designed by" will take the place of "Made in". "Designed by" will be the new label in identity and quality.

Globalization or internationalization of production and markets also forces us to take a

second look at some economic paradigms. Companies will be expected to cast a very different eye on current practices, and adapt their structure and organization accordingly to suit industrial mobility. Not the kind that involves things like outsourcing to Asian countries, but that which involves adapting to change. Companies, like mankind, will have no other choice but to learn how to change professions, and develop their ability to "do something else" with "what they already know how to do". Contrary to the past, experience or tenure is no longer the ultimate criterion for ensuring survival of the corporate fittest, but the *mob-*ability or capacity to move, be transferred, or even change jobs, all the while maintaining skill sets and expertise. It is no longer about "doing what one knows how to do better", but if need be, "doing something else with what one already knows how to do", and transforming it into a value. The ability to innovate will become an indispensable "goodwill" value.

The concept of renewal, which has proven victorious over the development of the market economy, will also have to revisit its foundations. Product substitution backed consumption and the growth of our economies to the point that "programmed obsolescence" was, in the past, a virtuous concept. Designers and engineers will have to devise products that last, and whose life cycle will be closely monitored due to a heightened, environmentally-driven conscience. Product sustainability will take precedence over recycling and reuse initiatives. The consumption revival, a subject near and dear to some political platforms, may even conjure up suspicion. The emergence of the "non-obsolescent product" is in the works.

Market saturation resulting from the non-renewal of certain products, will strengthen companies' obligations to be in mobile mode.

With flexible, adaptable and more local structures at their fingertips, their ability to be and do will prove even easier. Mobility may very well be a means of tackling a local form of re-industrialization, which may entice and prove beneficial to overseas territories and Western economies.

Lastly, the rise of new technologies has fostered awareness on the capacity to interact in product and service design. Contribution is replacing consumption. The consumer will play an increasingly visible role in the design of products. If, thus far, marketing has governed market economics, then contribution management is bound to make its way back to design and the shared design process.

DESIGN SCHOOLS, FROM CREATION TO MANAGEMENT

Given such a turbulent socio-economic climate, the number of remarkable opportunities awaiting design schools is not only impressive, involving the training of students who will occupy tomorrow's top managerial roles, but also commensurate with innovation challenges facing businesses and society on the whole.

In the past decade, they have already undergone a lot of changes and are the focal point in several countries. That said, their evolution is not over: they will lay the groundwork for

"centres of innovation" aimed at serving the financial front, and, on a more general note, society.

As places of creation design schools have legitimately trained creative individuals, comfortable with representation through drawing of products, space, life scenarios. Students know that what was asked of them did not necessarily need to be understood at once because involved a creation, a transgression of reality whose inherent nature did not always coincide popular notions of what designer can do.

For years, the designer has voluntarily delighted in this logic that made of him a "creative person" with a "singular" inspiration, who worked alone at his drawing board, and sheltered himself from others who could steal his ideas. Schools ⁄ in France especially ⁄ have encouraged this approach to "creative designers", "artist⁄designers". They have developed on the fringes of all academic institutions or prestigious schools incapable of working together during the rise of major university economic or technological research projects. Similarly, they had little to do with companies on the grounds that the economic gain could alienate the designer's ability to create. Numerous establishments in France and abroad continue to function on this model. Their success has enabled them to produce "artist⁄designers", some of whom have acquired international acclaim.

But some schools are being forced to move toward more professionalization. One reason is that there is a growing awareness that design, creation and innovation are engines of growth and development for businesses. The other reason, new to the field of design education, is the requirement that an institution should not be judged itself based only on the quality of its graduation projects, but rather on the quality of job opportunities found by students.

The responsibility of design schools is evolving: the focus is no longer solely on training "creative individuals", but "creation professionals". These minds are creative ones, exhibiting adaptability and incessant change, aware of the economic obstacles lining the paths of businesses with which they will be working. Joining forces with a multitude of backgrounds is capital, including engineers, marketing minds and financial folks, not to mention philosophers, sociologists and artists. To further embellish the creative process, exchange with those from myriad horizons is indispensable. Design is becoming a discipline of project management just as innovation is becoming a strategic move for business and society.

Student designers must learn the business at the same time as they learn to share collaboration, team spirit and the need to work together.

They have learned management: design, a creation discipline boasting the individual aspect there within encouraged by teachers, has become a collective problem⁄solving activity of increasingly complex socio⁄economic issues. The designer is a project manager. Within the company, she is the driving force behind collective thought on new products, corporate services, image, brand, culture, etc.

As obvious as it may seem, learning the need to swap ideas was revolutionary in the apprenticeship phase and in the minds of designers. Teaching methods adopt a completely new approach, and engender a radically different responsibility.

DESIGN SCHOOLS, FROM INNOVATION TO NEW "ENTREPRENEURSHIP"

The chance to work transversally with companies and other academic disciplines triggers a new type of responsibility, one that targets the creation and production of the objective, feasible and profitable. Imagination works wonders, and is indispensable in brainstorming, but its value is best optimized when transformed into viable scenarios, commercialized products and services and market consumables. If, on the one hand, creation can ⸱ and must ⸱ justify subjectivity of its creator, then, on the other hand, innovation's job is to ensure that the projects are viable. Faced with this requirement, design schools, aware of their responsibility, will, ultimately, take on a new identity: a centre of innovation exhibiting an objective and reproducible nature. They will become "centres of experimentation" needed by engineering schools to lay out scenarios of technology usage in a less threatening way so as to sway undecided voters. Business schools, also, will seize the opportunity to revisit an approach to product design that has often gone neglected in favour of distribution marketing or fundamental marketing research neither in tune nor in sync with current business needs. The academic drift imposed by the Shanghai ranking of best universities will be offset by a return to what business schools do best, namely business management. The most relevant schools have already created their "experimentation laboratories", their "design factories" or are turning into corporate laboratories for companies that have incorporated them. Befitting "research ⸱ training ⸱ corporate" ecosystems are already in the midst of assembling Masters of Design programs that increase the *hy⸱breed* learning, dual degrees and multiculturalism.

Thus, the era of "entrepreneurship" is in motion. The more viable the projects, the more tempted students will be to develop them. A new quality criterion will be implemented for the most efficient creation venues. The percentage of students who start their own business based on products they designed during their studies will be decisive. The more relevant the innovation approaches are, the more convincing students will have to be by "taking the plunge" into the world of self⸱employment. The goal is starting up a company for those students who have the ability and desire. Implementation of "incubation centres" is expected.

At a time when universities of management and economics are struggling to get a handle on the crisis, when engineering schools must demonstrate and defend progress, design schools could be on their way to becoming "centres of innovation", centres of experimental research needed by companies to help them think more objectively from another angle.

RESEARCH FOR DESIGN EDUCATION: SOME TOPICS

Antonella Penati[1]

In advanced industrialized companies, knowledge has become one of the main productive strengths.

Universities have always been and continue to be big organizations aimed on one hand at the growth of knowledge through research and, on the other, its dissemination through training. This is why the training education process, with the relative methods, dynamics and specific phenomenology, has, for some time now, been the focus of the obvious interest of the world of research which, from activities aimed at corroborating the contents of edu‐cation, also becomes an activity aimed at questioning the forms and models of education. This recognitive contribution intends to propose a reflection ‐ starting with the experi‐ence of managing educational processes matured at the Department of Design of Milan Polytechnic ‐ with regard to certain macro‐issues relating to the practices of education on the project around which new research interest and new experimentations are developing.

••• Theory‐practice; learning from experience; important of the context of action; verbal and visual •••

RESEARCH AND THEORETICAL REFLECTION ON THE HISTORY OF DISCIPLINE: EDUCATION AS A PRIORITY

This recognitive contribution intends to propose a reflection ‐ starting with the experience of managing educational processes matured at Milan Polytechnic ‐ with regard to cer‐tain macro‐issues relating to the practices of education on the project around which new research interest and new experimentations are developing. Very often, these interests or demands for research emerge directly from the didactic experience and problems relating to the pertinent dynamics.

The list is undoubtedly fed due to the fact that, within the specific sphere of design, the‐oretical research and experiments have a long‐standing tradition: from the theories and practices developed to offer education on the processes of configuration and formal synthe‐sis (the scope of research and reflection which opens up to an extensive series of collateral researches), to the dialectic relations between creative intelligence and methodical thought;

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to the relations that are set up between theoretical disciplines and laboratory practices (theory-practice); to the forms of an interdisciplinary nature and to the processes of reciprocal enrichment between disciplines called upon to converge around design problems; to the epistemologies of the creative act and, in particular, to the experimental researches that work around the logical elements that link the process of contextual analysis to the definition of form and design resolution; to complex studies of the user and of the numerous influences that characterize the design phase; to relationships between basic education and specialization and between academic education and practical-professional training; to the definition of the methods that can be used to assess the student's talent for design during the recruitment phase, progressing up to researches finalized at mapping the new design professions, defining a new taxonomy, and to the those aimed at building ratios - not just those of an economic nature, capable of registering the role of the design activity as an activity intrinsically addressed at generating change and innovation and as an engine to drive the creative industries.

And the list could definitely go on. Within this broad framework, in the space available in this report I have decided to look at two issues - which I would call thematic clusters, due to the series of sub-problems that each one has developed over time - which, in this case, I will look at not in conclusive terms but with the aim of opening up a debate on the range of problems tackled by the research into design education.

First of all, I would like to say that neither of these two thematic clusters is completely new, and they both find ample space in the intense debate that has accompanied the history of this discipline (Bürdek, 1992 and Bonsiepe, 1975). A debate which has come to no conclusion, and now faces new problems.

In fact, if we scroll through the recurring themes in today's theoretic reflection on design and on its education and research institutions and practices, it seems that we are still immersed in an experimental phase (Pizzocaro, Arruda & De Moraes [eds.], 2000) which can be connected to the ever-changing and constantly transforming nature of this discipline due to the obvious links between design and the artificial world; an ever-changing and constantly transforming world.

THEORY-PRACTICE

A first theme which has always been central to the reflection of design education is the theory-practice relationship (Maldonado, 1974).

The path of design education comprises a series of activities aimed at refining both the theoretic aspects and the instrumental and operational skills necessary to design.

The combination of different didactic experiences aims - or at least should aim - to form in the student that which, with Jane Abercrombie (2003), we can define as the capacity of "operational judgement". A capacity which, regardless of the specific skills and instruments of design disciplines, likens design to other disciplinary and professional spheres

with which, in the world of research and particularly research into education, new and interesting comparisons are being made.

The theory-practice dialectics are currently receiving new attention within the educational systems. Also within those systems which, despite not having historically paid much attention and given extensive space to applicative experiences in the educational process, and having preferred, for years, to follow the logic of an education conceived as the practical application of theory that had to be supplied as a priority, if not exclusively, in recent years - at least in Italy - the didactic path has been rearranged in the so-called system of "three + two" which issues, at the first level, a qualification that certifies the possession of autonomous professional skills by those entering the job market. Research into education processes has triggered a reflection on the sequences of learning, thinking back to the traditional theory-practice order and opening up interest in the investigation of the effectiveness with which the definition of professional skills is perceived through forms of *learning by experience*.

With respect to learning activities within the sphere of design, however, there has always been an awareness that, through certain specific opportunities of design practice, it is possible to mature those skills necessary to the formation of professional figures equipped with a complex critical and operational knowledge. Consequently there has been no lack of space for theoretic reflection.

The problems that seem to take on a central role in the research concern, on one hand, the methods and opportunities of learning from experience and, in close connection, the forms of reuse and transferral of the knowledge acquired.

LEARNING FROM EXPERIENCE

In the didactic experiences aimed at the acquisition of design skills, or the transmission of capacities to operate heuristically, design exercises occupy a lot of space. The judgement often attributed to this type of educational activity is that design simulations show their effectiveness in increasing the technical aspect, in acquiring operational and instrumental abilities (Lazzarini & Cugno [eds.], 1999) and that, vice versa, the cognitive knowledge that lies behind competent acts such as design cannot be learned from practice.

More recent researches, on the other hand, have focused attention on the cognitive dimension which is involved in the design simulations that form the place in which the mixture of theoretic knowledge and practical skills, between new experiences and old experiences, between primary know-how and accessory know-how acquired in an operational and situational way is created.

These researches into reassessing the role and the effectiveness of "active learning", especially in training aimed at those professional activities where the prescriptive components interact strongly with the discretional components (Ceriani, 1996), focused particularly on the organization of the programmes of the design courses needed to build design oppor-

tunities in which the breadth, depth, complexity, variety and overlapping of the situations in which it is applied guarantee structured training (Bonsiepe, 1995).

The attention of these researches is focused more on the didactic method and process than on the design result and the motivations that support choices in a constant comparison between regulatory aspects, given by the simple application of technical knowledge and abilities and discretional aspects, developing critical and speculative skills, as well as communicative and behavioural skills, all ingredients that intervene in solving problems (Schön, 1993).

The aim, in these researches, is to emphasize also how learning from experience cannot be traced back to learning from practice or through practice, because the practical solving of problems represents just one of the aspects involved in the experience.

In his work entitled *L'uomo artigiano* (2009) Richard Sennet grasps the wealth of the term experience starting from the German language which uses two words: "Erlebnis" and "Erfahrung". "The first indicates an event or an action or a relationship which provokes an inner impression, the second an event or a relationship which opens up the subject towards the outside and requires technical abilities more than sensitivity". The pragmatist thought of which Sennet is an exponent has insisted on the need to avoid the separation of these two meanings. Starting with the wealth of meanings encapsulated in these two terms, Sennet calls attention to the form and the procedure, i.e.: *the techniques of experience* because the cognitive and the technical-practical components can connect and develop (Bourdieu, 2003).

THE ROLE OF THE CONTEXT IN THE FORMATIVE EXPERIENCE

It is known that in design education systems, an inductive approach to design was used and this has had an experimental evolution over the years ⁃ known as the *Fundamental course*. This method, adopted initially at the Bauhaus and then at the Ulm school, was born with the aim of stimulating cognitive skills, not anticipating the theory but reflecting on the analysis of the design experiments carried out (Bürdek, 1992).

Despite acknowledging that this experience comprises elements of outstanding interest (Lindinger [ed.], 1988 and Bonsiepe, 1995), the model of the *Fundamental course* has also received considerable criticism by those who contributed to the experimentation. Gui Bonsiepe, for example, in measuring the positive aspects related to the logic of adding a progressively growing number of design variables to the growth in the design skills of the student, also criticised the excessive focus of the course on the aspects of formal refinement linked to the dominance of exercises of morphogenesis, use of colour and textures to the detriment of variables such as use, production, costs and characteristics of the materials considered to be excessively distant from the student's initial design capacity. The formal configuration process is not carried out autonomously but is connected to the formation of concomitant opinions on utility, attraction, economy, safety, comfort, environmental

compatibility, etc. (Bonsiepe, 1975 and 1995).

More generally, in every simulation process, reality cannot be divided into small parts and the phenomena cannot be studied one at a time, isolated from their context, extracting one or a few factors (Parisi, 2001).

These reflections are renewed in the face of the rather recent realization that every design system is born within a context and the latter occupies a central role in two senses. In the researches, there are at least two references specific to the context of the formative action are traced.

On one hand, the context "contains" the didactic design action and permeates it with all the technicalities of classroom activities, with the interaction between students and between teacher and students.

I am not going to go into this aspect, i.e., that of didactic exercise. All I want to say is that, in this case too, we are faced with numerous innovations and experimentations, Probably the most interesting theoretic substrate comes from social sciences and from the psychology of interaction and reference to the term "community of practices" is that which best sheds light on the process of construction of shared meanings, built into a didactic context.

In this case too, however, the results that emerge are deeply rooted in the unique, local position that has defined them and they are consequently less predictable and generalizable than the traditional theories on learning have led us to believe (Talamo & Zucchermaglio, 2003).

From a second angle, the context is the object of the design action and it refers explicitly to the combination of restrictions, resources, opportunities and players in the design action.

In this second situation too, attention to the context leads us to waive the hypothesis that the results of an action to acquire knowledge have general validity. It is explicitly assumed that their value is local and it is therefore interesting to assess the situational distance that separates the context from any further contexts of application.

From this further angle, the aims and objectives of the design action make up one of the variables that characterize the context and its influences on the outcomes of the learning experience.

Some researches highlight the not completely transparent nature of the processes of growth of knowledge that take place within design actions. The knowledge acquired within the design process is *opaque* and this opacity depends on the purpose for which the research or design action is being carried out. Finalized knowledge is born as knowledge contaminated by its purpose, because the cognitive act behind the processes of innovation strongly ties knowledge to interest and makes us see things in a selective way, because the attention is captured by certain aspects, while we remain indifferent to others.

Whether or not intentionality conveys meaning to things, whether or not intentionality allows recognition, is a question which has been extensively investigated by the gestalt theories, which have concentrated particularly on acts of designation and finalization as important modalities with different connotations ‚ through the intentionality encapsulated

within these acts ‚ and mental constructions of a problem (Kanizsa, 1980).

It is a typical operation of reduction of complexity through processes of focalization which leads us to select just some information, ignoring the rest, finalized at the cognitive aims.

As if this were not enough, we are faced not only with a cognitive result which is the outcome of an opaque process ‚ a process which has not allowed the retention and enhancement of most of the information which has been considered irrelevant ‚ but also with sticky knowledge.

Chiara Cardini describes knowledge that is the outcome of a finalized action as a form of sticky knowledge (1997). "Sticky knowledge" is the term he uses to identify forms of knowledge that are influenced, during the cognitive process, with additional and comple‚ mentary knowledge that converges into clarifying the particular cognitive area under inves‚ tigation, producing knowledge which adheres to the problematic context. It is as though the process of finalized knowledge were to reduce ‚ through opaque processes, processes of focalization ‚ part of the complexity of the context and, at the same time, add details, in‚ terpretative contaminations that make the knowledge absolutely connected to the purpose.

I think that these few hints, given as examples, are sufficient to restore the wealth of im‚ plications adopted by theoretic research in verifying the possibility to reuse what has been learned in a design situation which, every time, is considered unique. Donald Schön (1993), known for his work on epistemological issues linked to professional action, start‚ ing from didactics as a place for reflection on its own phenomenology, has shown how the systems of images, comprehensions, actions, interactions and narrations, built up within a specific design experience, can be activated and used only if the sense of the new situation is able to be retraced to what is already present in the existing repertory.

According to Schön, our behaviour is dictated by the logic of "exemplary" or paradig‚ matic cases analysed by Kuhn, and touches on that concept of pregnancy (Gregory, 1998) defined by Rudolph Arnheim in relation to processes of formal constitution. The experi‚ ences gained, in other words, lead to the construction of a repertory of cases and exemplary problems on the basis of which, in subsequent situations, we are able to compose new sequences of action using processes of change. In this process, it becomes necessary to per‚ fect a theory capable of coping with the mental and cognitive processes through which we are able to identify analogies and similarities between that learned in the new situations we have to face (Bara, 2000).

Besides having a good definition of the criteria of *analogy* and *similarity* which allows us to properly transfer the explicit knowledge linked to the *knowledge of what* (Legrenzi [ed.], 1994), the research also looked at the comparison of contexts (Rogers, 1983) identifying which characters of context have to be similar for the transferral to be effective.

Some researches in particular have concentrated on the analogies of problematic context, assessing that the transferral of knowledge related to the subject is actually quite simple, while the change in strategic context, for example, the change in resources and opportuni‚

ties, the change in time scale of the design operation, etc., is critical.

Certain theories look at yet another aspect of these dynamics, shifting the interest from the process of transferability of knowledge related to the subject and the context, to the transferability of process knowledge, considered as behavioural and experience-related knowledge, which is formed in the design (Petroni, 2000). In this case, it is particularly interesting to find modalities suited to holding and transferring those parts of tacit knowledge, i.e., the knowledge that can be expressed in terms of *knowing how to act* (Polanyi, 1979) which occur when we do things and linked both to forms of routine action and ability to perform, ways of acting, tricks of the trade that possess a sort of behavioural automatism, rather than specific types of knowledge and skills.

Bonsiepe for example, claims that "the methodology of design is based on the assumption that, in the design process, despite the variety of problematic situations, there is a common underlying structure, a series of constants that form the framework, creating an abstraction of the particular content of every single design problem" and it is the reinforcement of this framework that has to be pursued in the exercise of the design (Bonsiepe, 1975). And this framework which, with Pierre Bourdieu, we can call *habitus*, designs a way of being, a habitual condition, a predisposition, a tendency, a leaning, an inclination and is made up of languages, behaviours, cognitive models, methods and operating logics that are automatically triggered (2003). Habitus encourages behaviour moulded through practice and, to use Bourdieu's words again, possesses all the properties of instinctive behaviours.

TOWARDS A THEORY OF MENTAL SCHEMES

The type of knowledge that characterizes instinctive behaviours, in which the prescriptive components often risk being overcome by those of a discretional nature, moulded by beliefs and values, has been subject to extensive study within the scope of the so-called *helping professions* i.e., those professions which, in the medical and psychiatric field, are linked to prompt intervention in which interaction with the patient, the ability to immediately decode messages - which are often contradictory - with which the need and request for intervention by the patient and by other players is expressed, and also the characters of the context in which the intervention takes place, require a capacity for judgement, of discernment during the action. *Operative judgement* is the term, as I mentioned at the beginning, used by Abercrombie, an author who has done a lot of work on the possibility to correctly mature that discretional, subjective and personal component which, if not trained, risks making the capacity for design intervention misleading, through didactic training.

In her book entitled *Anatomia del giudizio operativo* (2003), Abercrombie explains that our capacity for judgement rests - and is strongly influenced, for better or for worse - on "mental schemes" which draw on the combination of theoretic knowledge and specific skills but also on performance practices acquired through experience. Mental schemes are

unconscious components, capable of directing perception and influencing processional intentionality.

If, on one hand, the mental scheme pre-constitutes a series of solution, reference and instinctive habits deriving from experience, like a sort of historical memory necessary to make professional operation effective, on the other, it takes on a defensive role, creating stereotypes, conformism and pre-interpretations that often aim to take control of perceptive chaos through simplifications.

For Abercrombie, it is indispensable, in the educational process, to expose the student to constant practical and experience-related tests on that learned at theoretic level, to form flexible and effective operating schemes that reduce the defensive component within the use of mental schemes.

In an educational process that aims to build a professional habitus, in the sense defined above, and an effective system of mental schemes, it is necessary to pay considerable attention to the perceptive process and to the communicative processes that allow us to encode and transfer knowledge.

VERBAL-VISUAL

The second part of this report focuses on this theme.

A second cluster of researches relating to education concentrates on redefining the role played by languages today. In these researches, carried out also within spheres that are central to design, the role of verbal language as the only way of transmitting knowledge is questioned (Sasso & Toselli [eds.], 1999).

The theme is one of the central issues of debate within the culture of design and directly influences the design education process. This is a sphere in which the production of theoretic contributions - which there has never been a lack of -, is currently witnessing a new and recent revival stimulated by the diffusion of new IT and digital media and by the spread of new forms of communication increasingly characterized by the prevalence of the image. The domination of visual culture has induced reflection on the survival of reading and writing as dominant forms of transmission of knowledge and learning.

Giovanni Sartori (2000), in a book written a few years ago, had announced the birth of a *homo videns* which is the result of society which produces images and cancels concepts. I think that Sartori's stance is drastic. However, it contains interesting areas of analysis linked to the transformation of *cognitive styles*. And it is here that I would like to begin.

With regard to the fact that every transformation of the container, of the medium, brings with it the transformation of the contents, much has been said. Equally consolidated is the awareness of how the change in the nature of the content and the container, deeply transforms the cognitive methods.

I would like to pause briefly on this second aspect, particularly because it enables us to reflect on the types of knowledge and the channels of learning concerned with design.

In his recent book, Raffaele Simone (2000), a linguistics professor at Rome University, introduces us to a new phase in the history of knowledge, in the history that should describe the way in which our knowledge, ideas and information are created and developed, which he describes as *Phase three*.

Phase three because, according to the author, it is preceded by at least two more big phases. The first coincides with the invention of writing and the possibility to use written signs to write information on a stable support, freeing the individual and collective memory from the weight of an enormous amount of data.

The second, almost twenty centuries later, is the silent revolution ⁄ which Elisabeth Eisenstein told us about ⁄ which coincides with the invention of printing. This is an invention which made books, which had been incredibly expensive and impossible to reproduce up until then, accessible to a vast audience, deeply altering various aspects of cultural and social life. From then on, for several centuries books were, and still are, a sort of symbol of knowledge and culture.

These two phases give us two extremely important methods of forming and storing knowledge: reading and writing. The issue is far from banal: our culture, our mentality are anthropologically in debt to the alphabet. Ours is an *alphabetical culture*.

Simone also defines the *alphabetical vision* of that method of vision that allows the acquisition of information and knowledge starting from a linear series of visual symbols. This method becomes a perceptive method and trains a sequential, linear and also analytical intelligence. It is the possibility to build articulated propositions that allows the expression of refined and investigative thought that characterizes us.

Today we have moved on to a phase in which evolved knowledge is acquired by listening (i.e., the ear) or through non⁄alphabetical vision (which is a specific modality of the eye) through a form of simultaneous intelligence characterized by the capacity to handle a large amount of information at the same time without the possibility to establish an order between them, a succession and consequently a hierarchy. It is a form of intelligence linked more closely to the dynamics of synthesis than to those of analysis and furthering, of the articulate and complex knowledge typical of an alphabetical intelligence.

The heuristic knowledge at the basis of creative and discovery processes, not just those behind the design action, but also those that take place in the world of science, is based upon a type of intelligence that has more to do with pictures than words, more to do with synthetic visual intelligence that verbal and alphabetical intelligence. One of the most current fields of interest occupying the philosophers of science is close to the typical dynamics of creative thought. Gerald Holton (1983) way back in the 1980s dedicated a text to *scientific imagination* describing the role that creative thought has played in many processes of scientific discovery.

Holton's theory is that, in the growth processes of knowledge, where the heuristic procedure is dominant, visual thought, the thought triggered by *mental images*, images which

very often are only subsequently recomposed in logic-mathematical or logic-verbal intelligence, take on great importance.

VISUAL THOUGHT: CULTURE AND PRACTICE OF DESIGN

If this is valid in the world of scientific discovery, it is even more so in that of design.

In educational processes and particularly design education, visual culture and *visual thought* (Arnheim, 1974) have always played a central role as a necessary "substrate" to read the contemporary languages and as a process of imagination which draws on the repertory of visual knowledge at the basis of formal configuration processes and, lastly, as a specific "tool" of the world of design. The way of producing knowledge through design has to do with the culture of representation, portrayal and production of images. In other words, visualization constitutes one of the cognitive and instrumental abilities central to the education of a designer.

Visualizing is a typical practice of those of design and there has been no lack of theoretic attention to this practice, which represents a veritable cognitive style.

Translating thought into pictures is a typical way of triggering design thought.

But visualization is also the most common way of communicating and sharing design thought.

Indeed the different forms of representation - from open representation like the sketch - to closed and finite forms of technical-executive design, passing through all the forms that we know, graphics, story boards, photography and video, to forms of 3D representation and the model, are all aimed at comparing and transmitting information, not using verbal language but a language made up largely of pictures where text, to use the words of Anceschi, is often used in caption form. This attention to visual thought - as I was saying - has always been present in big issues relating to design but, above and beyond the transformation of the media and relative languages, even in the specific world of design there are new facts that contribute to conveying new centrality to this theme in research into educational practices. I mention it briefly looking at a few contemporary research locations.

A first area of research works on the new complexity of the subject of design, the reference theme being not so much the visualization of the physical qualities of the subject as the visual restoration of the value-related characteristics of the artefacts: visualizing the sensorial, communicative and emotional qualities that, in the contemporary scenario, make up the determinant factors in the construction of the product and brand identity. Among other things, the enhancement of the intangible qualities of artefacts represents an important professional area in the world of product identity communication. In the crucible of experiences that goes by the name of *primary design*, Italy has, in some way, led the field in devoting considerable attention to these themes. However, the experimental nature of this intuition has not left an encoded knowledge that can be easily transmitted and used in learning practices.

It is a case of reviewing and completing the encoding of these experiences and arranging that system of reflections around sensorial aspects and the visualization of qualitative aspects such as sounds, smells, flavours and tactile sensations that require other tools, for accompaniment and integration, to be restored and shared.

A second area of research linked to forms of visualization is concerned with the fact that, increasingly, the subject of design is no longer just a physical artefact but the scenario consisting of possible future worlds where the product or products (where they exist) are just one of the elements that make up the visionary landscape of the designer who faces up, in this case, to the ability to implement new values, behaviours, methods of use, functional solutions and possibilities of service, moving in a design process where the design sphere is concerned with the need to restore intangible characteristics which have to find a way to be translated visually. And in this case too, there is a new professionalism, in the design of scenarios, between those working on product strategy and those who communicate. This area is undergoing considerable development. This area of visual experimentation includes, for example, the trend tables developed in the fashion world, containing visual, chromatic and material indications, that identify certain trends that will be used by designers later when they design the season's collection. These techniques, better known as mood boards, have migrated to other design spheres, such as the automobile sector for example. But I do not think that they gave satisfactory results when passing from 2D to 3D vision of the object. In terms of the products, there are also other ways to build scenarios: most people are familiar with the videos created by Philips design for the launch of new electronic products, a world in which new needs and new responses are often in demand, approached by the proposal of concept items which are launched on the market before the final product is actually ready. In these videos the reconstruction of the concept in which the product is placed is more important than the product itself. Stimulating a need rather than not providing an answer through a product seems to be the problem of these visualizations.

A third and increasingly consistent area of analysis and research investigates all the forms of visualization that precede the moment in which the idea of design intervention becomes tangible. The pre-design investigations that often extend into the world of economists (such as sector, market and merchandizing analyses), of marketing men (such as analyses related to corporate identity and values linked to a specific brand), of sociologists, anthropologists, ethnographic experts, psychologists and ergonomists (such as those relating to new forms of use and consumption, user analysis and analysis of his buying habits and use of the product, to the need to precisely define the micro context of use that derives in terms of type of use, etc.) need to be publicized with different methods aimed at the translation of design. The designers in these cases, even before they present their design ideas to the customer, are called upon to compare notes with the latter on the preliminary assumptions, on elements generated by the reading and interpretation of these details. In this case too, the method of visualization of this part of the design process in such a way as to ensure that

the results approach and evoke the main elements of the successive design, is an issue of recent interest.

A final aspect closely connected to the others regards the fact that this complex system made up of intangible ideas, value-related aspects and tangible parts is part of an imagery which must be given shape, which is not and cannot be inside the designer's head, but must become a shared matter.

Sharing, making several players part of the process of debate and construction of the scenario takes on new importance. In other words, it is a question of working on forms of sharing solutions that are only partly tangible, that have to be understood by players who are often not designers (businessmen, institutions, technicians, economists, sociologists, etc.) who possess a rather restricted visualization ability, and there is a need to represent/visualize these complex forms of knowledge in a new way to make them explicit.

Just a brief mention of the theme which, in my opinion, joins these different researches. In all of them we can see how the representation loses its mimetic connotation (similarity to reality) to move towards the symbolic/evocative/allusive dimension.

In these researches, the interest is no longer linked to the form of analogical representation that reproduces the similarity with the content, relying on the principle of similarity. We are in a situation in which the principle of similarity alone is unable to have cognitive value. Words and pictures in these dynamics often play the role of being the representation of something that really stands for something else. Here the evocative and symbolic aspect of verbal language and visual language form founding instances of sense and becoming dominant in the construction of a shared image of new models of reality.

And it is on this theme that research is working: what are the operating modes of symbolic images? For these themes, considerable importance is held by those studies which focus on the capacity of the image to reflect abstract concepts (just think of the different forms of visual representation that have visualized terms such as time, space, sacred and profane in allusive terms, filling them with tangible significance) and the capacity of words to refer to tangible worlds, visual and sensorial references.

This report does not claim to thoroughly examine the capacity that research has in relation to traditional themes, but simply to highlight how design - an open discipline - is perhaps destined to keep open the areas of research that regard its practices and, among these, the practice of teaching, which plays a critical role in launching the foundations of this profession.

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MATto - A NEW MATERIAL LIBRARY
AT POLITECNICO DI TORINO, DESIGN COURSE

Claudia De Giorgi[1]

MATto is a material library which includes more than 500 samples of new generation materials, particularly used in the field of design and architecture. MATto has been developed in the Politecnico di Torino Design Course, also with the help of the students, in order to keep designers up to date about the latest materials available for their projects.

MATto in 2010 has become a consultancy service supported by Torino Chamber of Commerce for the Small and Medium Enterprises (SMEs) of the Piedmont Region in Italy.

Up to now, for each MATto material sample, an analysis sheet is arranged, which reports the technical (physical-mechanical) properties of the materials, its applications, the available format and a cost estimation. But the innovative aspect of MATto is to provide meta-project solutions by identifying new materials or semi-finished products suitable for every specific need or request of each project, based not only on the technical and economical performances: also the sensory and environmental material properties are considered.

The environmental profile is aimed at acquainting the decision maker with the materials' environmental aspects by adopting a cradle-to-grave point of view. Consequently, an eco-profile of MATto material takes into account how the material environmental properties could change in accordance with the product requirements. As a result, MATto is a tool for the problem setting, by which the designers (and the students, and other figures involved in the product development) are assisted for identifying which material parameters influence the product eco-performances.

The sensory profile could be useful for considering the human perception of material too. Specifically, the touch, sight, smell and hearing senses are taken into account with the help of specific tools (also patented by the MATto group), in order to define a simplified "sensory vocabulary", which could become a universal reference tool. In the vocabulary, the adjectives are specified according to a scale of values, which has been identified according to the results of different analysis sessions carried out by "tasters" (groups of 20/30 people, also students, untrained and trained, to test the materials and describe them using specific instruments). The scale of values immediately quantifies the characteristic described by the adjective. In this way, the designers could be guided when they are dealing with the

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expressive-sensory aspects of the materials.

Consequently, by using these four research keys/point of views, technical, economical, environmental and perceptual properties, the most suitable materials selection provided by MATto could be compared with the analysis of the traditional material provided by other well-known databases, and could become the key for future designers to improve the SMEs development, according to the current sustainability and innovation trends.

••• Materials choice; sensory; sustainability; project •••

THE ROLE OF THE DESIGNER TODAY

Selecting materials is a design issue. The designer today is a key figure who, thanks to his expertise and ability to connect different professionalisms, acts as the main player and the link between the business world and the complexities involved in managing environmental and sensorial issues. His role is crucial in environmental issues as "eighty per cent of the environmental impact made by the products, services and infrastructures around us is determined at the design stage. Decisions taken at this time shape the processes which determine the quality of the products we use, the materials and energy required to produce them, the ways they are used on a daily basis and their destination when we no longer require them" (Thackara, 2005, 11).

The role of the designer is, however, also important for shaping and satisfying new requirements for sensory elements, pleasure and depth of experience, that are emerging from consumers.

Sustainability and sensory elements are therefore not aspects that are unique to the specific sector of eco-design, but which involve the design as a whole.

Only by making changes upstream, by addressing the cultural approach and initial strategies that lead to the product, can we change the business logic and rationalize not only the object and its entire life cycle, but also the strategies that underlie the economic and industrial policies, in order to create products that are truly environmentally-friendly but which also express their sensory and expressive features.

DESIGN, SENSORY ELEMENTS AND SUSTAINABILITY

According to the most advanced trends in design culture, the choice of suitable materials for creating the product should be dealt with as early as the meta-project phase, which is then expanded upon and loaded with meaning: materials, in fact, have a significant influence on the design; they support its technical functionality and at the same time create its personality. Choosing the materials for the product, until very recently, was put off until the final stages of the project; recently, however, designers have realized that if this choice is made from the initial stages of the design path, the product will have more chance of meeting the initial requirements.

Those requirements have greatly evolved: products are no longer required only to have the traditional aspects (relating to physical-technical-mechanical requirements, reliability, safety, etc.) but, in accordance with our changing times, they must also have "soft" properties, such as increased sensory expressiveness and, at the same time, complex elements such as a plan for the life cycle of the product which respects our planet.

In this increasingly articulated framework, in order for the designer to be able to choose the most appropriate materials for his project from the earliest design stages, he must not only be aware of the updated panorama of what is actually possible but, in particular, he must be in a position to analyse that in relation to his project. It is therefore crucial to provide the designer with criteria for interpreting, and methods for evaluating, the sensorial and environmental performance of materials, so that he can be guided in his choice.

This must be a tool which can be adapted according to different cultural contexts and based upon the assumption that there is no significance in talking of environmentally-friendly or "sensorial" materials in absolute terms but, rather, it is necessary to select the materials or combinations of materials that seem more suitable in relation to the different contexts for use, useful life and end of life of the products.
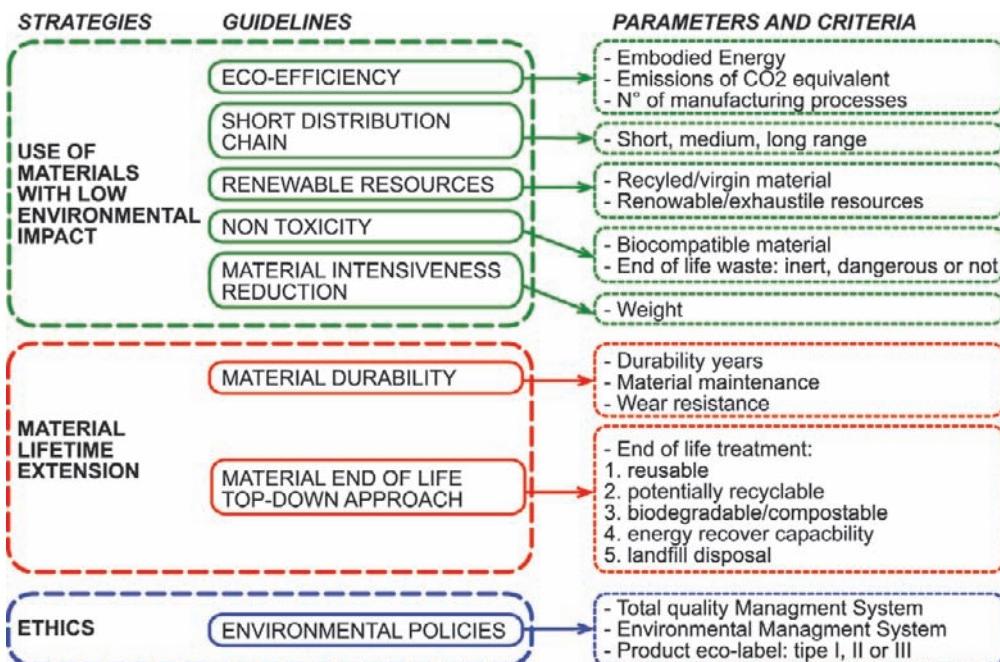

FIG. 1. MATto APPROACH TO THE MULTI-CRITERIA RESEARCH OF MATERIALS.

MATto

Materials analysed in terms of physical-technical-mechanical aspects and investigated from the perceptual and environmental sustainability aspects constitute an innovative tool to assist the design and the designer.

This approach is now applied in MATto, the Material Library of the Design Course at the Politecnico di Torino. A material library, or rather, an interdisciplinary centre for discussing design, sensorial elements and sustainability in a scientific context, with experts able to work alongside in-house designers and freelancers in the quest to solve problems connected to creating new products and to improving existing ones.

What the university is offering is not just an interpretation of the parameters of the existing situation and not just theoretical references to a hypothetical sensorial state which often makes way for mere suggestion or for the empirical; instead it is opening itself up to companies and designers with the aim of providing a useful and effective service.

MATto is a material library which includes more than 500 samples of new generation materials, particularly used in the field of design and architecture. MATto has been developed in the Politecnico di Torino Design Course, also with the help of the students, in order to keep designers up to date about the latest materials available for their projects.

Up to now, for each MATto material sample, an analysis sheet is arranged, which reports the technical (physical-mechanical) properties of the materials, its applications, the available format and a cost estimation. But the innovative aspect of MATto is to provide meta-project solutions by identifying new materials or semi-finished products suitable for every specific need or request of each project, based not only on the technical and economical performances: also the sensory and environmental material properties are considered.

The environmental profile is aimed at acquainting the decision maker with the materials' environmental aspects by adopting a cradle-to-grave point of view. Consequently, an eco-profile of MATto material takes into account how the material environmental properties could change in accordance with the product requirements. As a result, MATto is becoming a tool for the problem setting, by which the designers (and the students, and other figures involved in the product development) are assisted for identifying which material parameters influence the product eco-performances.

It is hoped that the MATto-materiali per il Design (MATto Design Materials) service (under an agreement with the Turin Chamber of Commerce which makes the centre available to manufacturing companies based in Piedmont) will also take root at other universities so as to support the design process which is today more "sensitive" and complex (innovation in terms of sustainability and sensory elements), and where the designer often finds himself alone, faced with crucial choices which are not only expressive but which, above all, are becoming more stringent.

THE WORLD'S MATERIAL LIBRARIES

Today there are millions of different materials and new ones are constantly springing up: "The proliferation of new materials and the enormous technical and expressive possibilities offered mean designers must keep continuously updated on their properties and possible applications" (Langella, 2003, 75); in fact the designer and manufacturer are faced with a huge and growing scope of possibilities, in which the choice of materials and the transformation processes can be combined, giving rise to what is known as "hyper-choice" (Manzini, 1986).

There is, in fact, no specific material which stands out as an almost mandatory choice for a type of product, but many different materials in competition with each other: only a careful, in-depth analysis, with a perspective that includes the entire life cycle of the product, can result in identification of the most satisfactory solutions.

In order to search for, classify and sort technical information relating to materials and products for the world of architecture, design and industrial production, "material libraries" have been created; real and virtual archives of indexed material samples that are offered to designers as research tools in an attempt to increase awareness of all the materials available today.

The term "material library" is a neologism, coined to identify physical or virtual places in which technical information is collected and made available in relation to a wide range of materials, particularly in the world of architecture, design, fashion and industrial production in general (Lerma, De Giorgi & Allione, 2011).

The first material library to be opened was Material Connexion, founded by George M. Beylerian in 1997 in New York, with another base opening in Milan in 2002.

Material libraries are not just born from the need to assist the designer in gathering information on new materials, but also to help companies make themselves known on the market, to form part of a community and thereby gain contact more quickly with other organizations, to build solid collateral and publicity and to meet potential new customers or partners. The material library was created to respond to the need shown by companies and institutes for a structure capable of interacting with the user, for a physical and virtual place, which constitutes an evolution from portals (considered more as containers of technical data) and which is also a creative workshop. In general, material libraries operate in the service sector, researching and systematizing innovative materials: they use various means of communication, organize fairs and exhibitions, create newsletters, disseminate information that is accessible to all and publish books showcasing materials.

Material libraries are actually being continuously updated: those responsible for these services must always be vigilant and seek innovative and interesting materials and processes, in order to enrich and enhance the knowledge within the structures themselves and to be able to compete with other material libraries that appear on the market. In the majority of cases, material libraries offer services and advice whose nature "is predominantly commer-

cial and is characterized by networks between various interested parties: manufacturers, designers, researchers, etc." (Lucibello, 2005, 29). Material libraries are a growing trend, whose function varies from advice on innovative materials to support designers during the design phase, devising the concept, and prototyping.

"For some designers, material libraries are primarily centres in which to find inspiration for new projects; there are people who consider them as places to visit, like a contemporary sculpture exhibition or a 'documentary' of current affairs, in which 'curious' simple materials with an extra-terrestrial aspect become major protagonists or collector's items [...]. For others, they are considered places in which to work, to conduct in-depth research on a specific component with the possibility of drawing upon the expertise of consultants [...]" (Campogrande, 2009, 67).

The latter is the best way of looking at material libraries: places of research and documentation, where you can touch materials, get to know all their features up close: places providing information and advice to those who need to locate innovative materials and technologies to enhance their projects and industrial processes.

Each structure is characterized by its own method of cataloguing: all usually catalogue materials according to the family to which they belong, physical-technical-mechanical aspects and current applications. Some material libraries, however, aim at offering an extensive panorama of all material families; others specialize in particular sectors of application or in a specific material category: this is the case, for example, for Matrec®, the first Italian database for free public dissemination on the main themes of eco-design of materials and recycled products, or for Materioteca®, also Italian, dedicated only to plastic materials, already equipped with educational and research structures and for Materiautech, a French structure, dedicated also to research in the world of plastics.

Finally, the latest evolution in these material libraries was to include among the cataloguing criteria the perceptual characteristics of the materials or their environmental friendliness.

Having recognized the importance of the tactile, visual characteristics... of the materials, the multi-sensory element has become a factor for cataloguing materials in material libraries, at times according to the technical approach (reflective power, heat conduction, acoustic features...), and at other times according to the perceptual approach of an empirical nature, based upon the perception of the materials by human organs, but focused upon the practical and not always upon scientific criteria.

In some, materials are analysed according to sensory words, but the evaluation of materials is often conducted through manipulations undertaken by the team that catalogues the materials, and is therefore based only upon the experience and expertise of those team members, and not upon a substantial, trained scientific sample of "material tasters".

Each institute draws up its own individual system of cataloguing and evaluation.

Unfortunately there is no common language, vocabulary or method of sensory evaluation for materials that is based upon scientific, but also simple and comprehensible, criteria,

which would make the results of the actual analyses available to all: industrialists, manu-facturers, designers, students.

It is therefore necessary to develop a method of sensory evaluation which, through words, images or other forms of communication, is able to collate, translate and simplify the exist-ing methods of sensory evaluation in a comprehensive way.

Within the world of material libraries, in addition, a key issue is the evaluation, which is not always homogeneous, of the environmental friendliness of innovative materials.

The need to respect the environment has already positively raised awareness in material libraries, for example, with the gathering and collecting of new materials designed to be environmental friendly during their production or use (see, for example, the materials in-spired by biomimicry criteria), but it has also highlighted the need to provide environmen-tal information on the materials already stored within the libraries.

Therefore, just like the sensory element, the environmental element also highlights the requirement to provide, in new and direct ways, data and information in relation to the environmental performance of the materials, linking them more clearly with design opportunities.

It is therefore necessary to provide data which is not just quantitative, but which is also qual-itative, that is, able to provide information on the behaviour of the materials during the dif-ferent phases of their life cycle. Information based upon scientific methodologies and tools, but which is easily interpreted by designers when they come to select a material for a project.

THE SENSORY VOCABULARY

The sensory vocabulary, developed by researchers working in MATto, defines and de-scribes, through "descriptive adjectives" and scales of value, the sensory characteristics previously identified by the group of "tasters" (groups of 20/30 people trained in testing materials and describing them, using scientific instruments), and is supported by relevant images, videos and sounds. The scales of value which accompany the descriptive adjec-tives are aimed at immediately quantifying the value attributed to each adjective. The im-ages of the materials and the videos of the samples being manipulated, which accompany the vocabulary, are a quick way to make clear and explicit the meaning and value assigned to the descriptive adjectives.

The descriptive adjectives which make up the sensory vocabulary represent the first level of searching for materials according to expressive-sensory elements.

It will, therefore, be possible in MATto, and in the database being developed, to search for a material by selecting the pre-chosen adjectives; the search can include adjectives relating to just one sense or to the four analysed senses, for example: the "soft, smooth" feel, the "opaque" look, the "odourless" smell and the "light" sound.

This first search level will highlight various materials, characterized by different and mul-tiple physical, technical and mechanical characteristics and environmental friendliness,

from which the designer will be able to choose the one that is most suitable for his project. In the vocabulary, adjectives are specified according to scales of value (from 0 to 100 as regards touch) which have been identified based upon the results of various evaluation sessions, conducted by groups of tasters and according to sounds and images which illustrate and document the tests and manipulations conducted on them.

The scales of value, currently accessible for characteristics of touch, immediately quantify the characteristic described by the adjective. The manipulations of the materials have been conducted in accordance with the methodologies devised to highlight their touch, visual and sound characteristics.

The images, videos and sounds of the manipulations represent an immediate way of understanding the significance of an adjective and a value used to describe a material: for example, with regard to shape memory materials, it is extremely helpful to have a video which shows how long the deformation, and therefore the shape memory, lasts.

The value scales, images, videos and sounds of the manipulations are a second and more in-depth search level, which is useful for those who are already clear of the values that a material must possess (softness 60 out of 100) or for anyone wanting to elaborate on the meaning of the descriptive adjectives.

transparent
opaque
shiny
translucent
satin
metallized
reflective
colorful

material odour
odourless
perfumable

hot
cold
hard
soft
rough,
smooth
sliding
braking
sticky
shape memory
stringy
rigid
flexible

gentle
hard
thick
thin
sharp
dull
inharmonious
soft
strident
calm
weak
smooth
rough
high
low
metallic
deep
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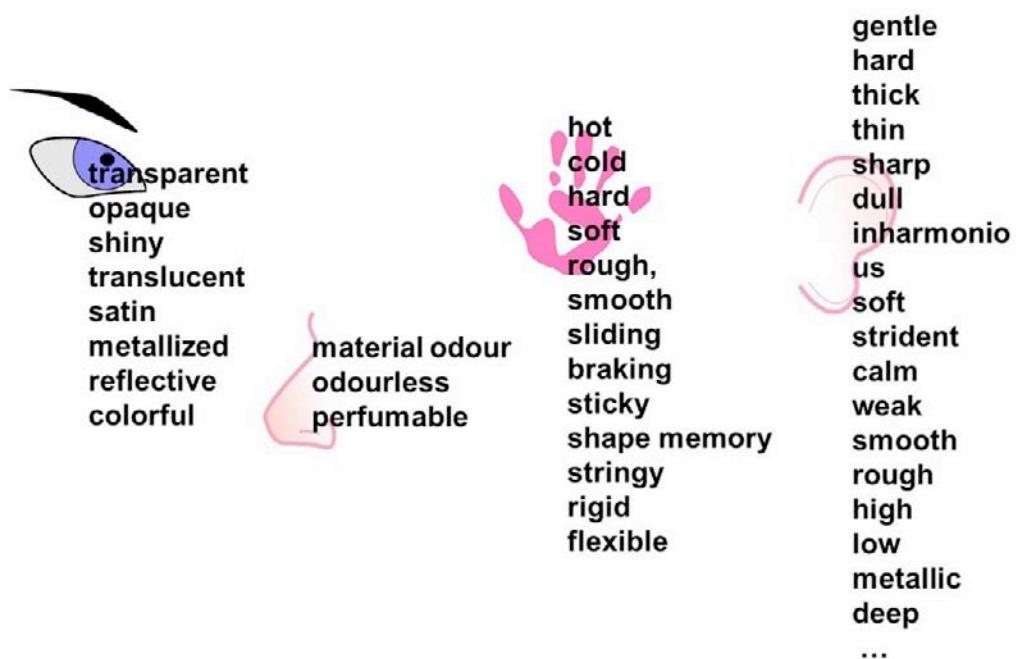
FIG. 2. THE SENSORY VOCABULARY CREATED AND USED IN MATto.

THE CHARACTERISTICS OF ENVIRONMENTAL FRIENDLINESS AS A RESEARCH TOOL

The methodology also investigates the aspect of environmental sustainability of the materials, providing basic information about energy consumption, toxicity and the possible end of life scenarios. This is quantitative information accompanied by qualitative indications, characterized by a strong planning vision: materials that are completely sustainable do not exist, but methods of sustainable use.

Data referring to the environmental friendliness of materials is grouped according to their main categories: the use of materials with low environmental impact, extending the life of the material and the ethics of the manufacturer/supplier. Within these main categories, some parameters have been identified (embodied energy, toxicity, etc.), on the basis of which guidelines have been drawn up for the design which are useful in evaluating the materials suited for a sustainable product. Based upon these guidelines, parameters and criteria have been identified for measuring/evaluating the materials; the parameters indicate how each investigated material meets the environmental friendly design guidelines.
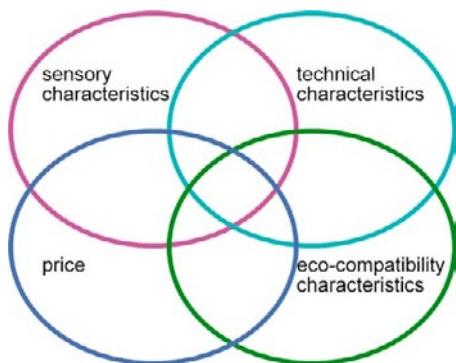

FIG. 3. OUTLINE OF QUALITATIVE AND QUANTITATIVE PARAMETERS IDENTIFIED TO PROVIDE A MULTI-CRITERIA EVALUATION OF THE SUSTAINABILITY OF MATERIALS AND SEMI-FINISHED PRODUCTS.

WHAT DOES MATTO OFFER?

The sensory vocabulary, with its variations, and the environmental friendly characteristics are part of the information/technical sheets which accompany the materials catalogued in MATto: the information, provided by companies or discovered and validated by the research group which works to develop the material library, is completed by information relating to the perceptual element of the materials and their environmental impact.

In the material library it is possible to research materials based upon their technical characteristics and based upon costs, as has been customary to date, but also based upon the criteria of sensory elements and environmental friendliness. The cross-referencing of these four areas of research greatly reduces the range of materials which meet the demands of the designers: "The choice of materials for a certain design represents an opportunity to be grasped in order to enable technological transference and innovation. A good designer

establishes at an early stage the materials to be used, or the company does on his behalf, and according to the scope of his work, he develops his research to adapt perfectly to the design objectives" (Lucibello, 2005, 80).

Materials can be researched according to the four areas, as previously noted: the first and classic search, based upon technical data and material costs, can provide a list which is still quite long, and is, though, narrowed down by research according to sensory elements and environmental friendliness such as, "soft and smooth" to the touch, "opaque" to the sight, "odourless" and with a "deep" or "low" sound and with embodied energy that must be below certain values. A cross-referencing interpretation of the characteristics of materials can, for example, be done by starting with the need for sustainability, in particular, biodegradability; from the materials which meet the characteristics, you can then exclude those with sensory elements that are less significant from a design perspective.

In the continuous research of innovative materials, two issues will increasingly intersect; sensory elements and eco-compatibility: "[...] An encounter that connects, in a systemic and holistic vision, the criteria of ethical and differential production with those of a rich and conscious consumer, in a conciliation of local and global values. Sustaining sensory elements is aimed at bringing together the concept of the territory with that of the consumer, in the knowledge that the understanding of a product runs from awareness of its production stages, and occurs by being able to trace its evolution from matter to final goods" (Ceppi, 2009, 117).

This new and complex approach to design, and in particular to the meta-project, is expressed through critical exploration of the materials and is completed with the help of virtual reality and prototyping. Real and virtual models of designs containing the map of materials to be evaluated are submitted to be selected by the customer in both traditional and new ways.

The choices made by designers according to technical criteria, costs, sensory and environmental elements can actually be evaluated also in non-conscious ways, through the use of non-verbal methods and tools such as the eye-tracking machine, a hypothetical means of final assessment.

Eye-tracking provides decisive evidence on the ability of the product/interface to attract and retain or divert the attention of the observer: it is based, in fact, upon recording what an individual observes or ignores when they decide to consider a certain product.

The analysis can be applied with equal effectiveness to real and virtual prototypes: an interesting indication for optimizing costs, particularly in cases where the investigation generates design feedback which gives rise to new evolutions of the concept.
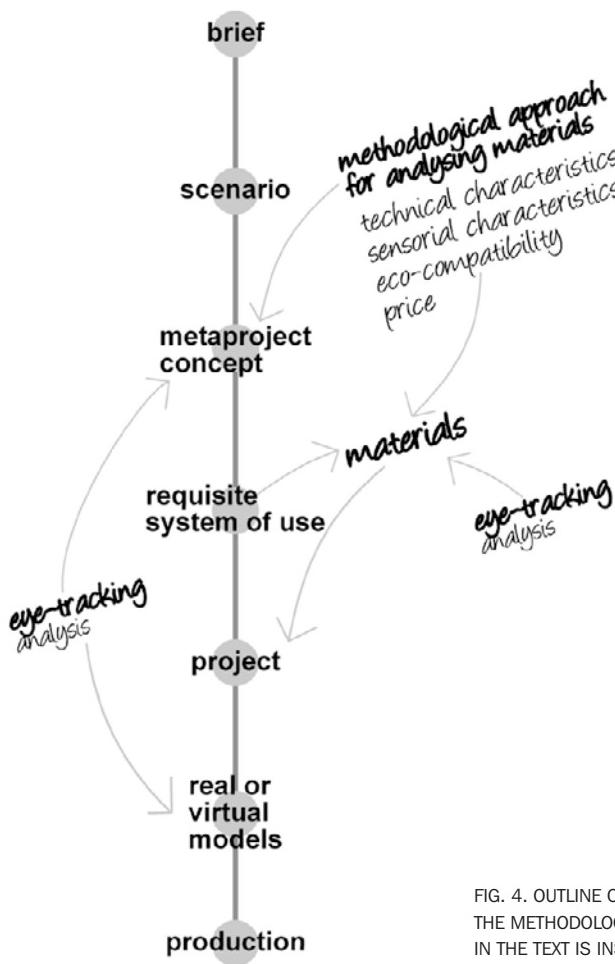
FIG. 4. OUTLINE OF STAGES OF THE DESIGN PATH IN WHICH
THE METHODOLOGY FOR ANALYSING THE MATERIALS PROPOSED
IN THE TEXT IS INSERTED.

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WASTE SYSTEMIC DESIGN.
THE SYSTEMIC APPROACH TO THE ORGANIZATION OF A MANUFACTURING PROCESS BASED ON THE RECOVERY OF RAW MATERIALS FROM WASTE

Marco Torchio[1]

The art of designing is the only one able to link environmental problems with the demands of growth and development of the market, the only one able to transform the problems of the first in the resources of the second. Therefore economy, planned as such, finds its reason to exist in environmental protection. Waste can be rightly considered as a local resource. Designing raw materials derived from waste recovery with efficiency means helping local markets.

••• Systemic design; waste; cost-effectiveness; local economies •••

Our industrial group, established in 2004, starts and sustains production processes based on the recovery of raw materials from waste. The logic followed was to create systems of societies organized like a chain. This has allowed the specialization of each ring in the chain of production, increasing the ability to optimize the process through dialogue with external actors.

The company Keo S.r.l. is the operating arm of the group, that is the subject to which is entrusted the task to shape a project by identifying the elements of the necessary production process and arranging the operating entities of relevance. The mission is to propose solutions united with eco-design, eco-architecture, eco-engineering and eco-communication.

The market can be used to create richness in an ethical way by applying the principle of environmental sustainability together with sustainability of economics. We refer of course to a "real" sustainability, being supported by numbers and measurable data according to the life cycle assessment science which measures the actual environmental impact of a product or process.

Scarce resources, energy crises, mountains of unused waste: the current system is in difficulty. Together with the first and fundamental condition of economic sustainability, systemic solutions respect the criteria of environmental sustainability and social equity, essential fac-

[1] Keo S.r.l., President.

tors for the development of a project. An environmentally friendly path that coherently connects research, production, distribution, sale and consumption patterns can be created. "Make money saving the planet" is the slogan which best represents the commitment of the company. Two are the cornerstones, firmly interwoven, on which the ethical model is based: the creation of wealth and the communication of values. Two are also the macro-areas of intervention. The first one is the offer of a wide range of services to companies in the field of ecological reconversion of activities, with particular attention to the topic of technological engineering in construction. The second one is the organization of chains which increase the value of waste materials (for example: PET bottles, old barriques, cardboard packaging).

Our commitment is to study and propose solutions, demonstrated through numbers, able to reduce the environmental footprint of products and production cycles. Assisting entrepreneurs and institutions along their way toward more ecological and cost-incisive behaviours allows them to communicate sustainability. Diminishing waste production, building a house with zero or low energy consumption or using recycled materials instead of virgin ones as raw material are examples of eco-solutions. An eco-solution is effective only if it is economically worthwhile: in fact, if on one hand it decreases the environmental impact of the activity, on the other it produces an economic gain, in terms of cost reduction and/or in terms of communication increase in value.

We start from the study of waste in a specific geopolitical context and through the analysis of available technologies to its transformation elaborate project ideas, taking their compatibility with the market into account. The concept of eco-sustainability is therefore expressed through the non-movement of waste, in respect of which the perspective has to be overturned: from something to get rid of to local development resource.

In our planning a system is a set of subjects or elements combined according to the logic of coexistence (complementarity, competitiveness). A manufacturing process normally consists of phases linked according to logical sequence from inputs to products or services to be delivered to the market. We know that a systemic process manages a network of production processes with the aim of improving quality and lowering costs through the creation of positive relationships in the input-output exchange.

By thinking about the organization of a systemic production process that bases its economy on the recovery of raw materials from waste, we regard citizens as suppliers of raw material and first actors of the process, as well as market makers and final subjects of the production cycle. If man is at the heart of the project, the need of man is the project. This is our work philosophy. The reason that has led us to choose the system is the convenience of being together. Being together in a systemic way is the easiest way to be strong and is the fairest way to share successes and misfortunes. We must not forget that the lever that moves a system is convenience, so convenience is the subject of design. The project has what it takes to transform an idea into a source of economy and planning of economic convenience is the real goal.

Affordability must be planned with the logic of the enterprise and spread with the logic of politics. The secret is to be understood: the more the project is understood the more it is profitable. Then the project should be based on simple reasoning and must be spread by simple languages. Simple things are those that are more easily imprinted in our minds and the ones that give us more security.

If it is true that economic advantage is what leads the market to destroy the planet, we are convinced that anyone who is destroying the planet today is willing to adopt the technologies that, bringing even more economic benefit, respect it. So if it is true that the market is destroying the environment it is equally true that the market will save it.

A big question concerns what a designer should do. In our opinion, the project is what has to respond to a need. Then the designer must think about designing an economy around a need. He must be able to read the market and place the economy that meets the need within the market. A successful project turns a problem into an economic opportunity and increases the well-being of the people concerned.

The project must be able to transform waste into a resource. It is the instrument for the regulation of the markets because markets are made of men with different needs and the timely and optimal satisfaction of those needs consolidates and defends that market compared to others.

The purpose of the designer is to express the best that a technology can provide. The designer should behave with the technology as a driver behaves with his car: using it at its best and controlling all the available power.

A well-used technology is always convenient and competitive. A product that allows production costs to fuel a trading system correctly by coming to the end user with a fair and accessible price is a well-designed product.

OSCAR FARINETTI AND EATALY - THE DESIGN OF AN AGRO-FOOD EXCELLENCES NETWORK

Pier Paolo Peruccio[1]

The Design Processes Award was presented to Oscar Farinetti, the entrepreneur from Alba in northern Italy, who invented the Eataly format.

What is Eataly? It is the first supermarket in the world devoted entirely to high-quality food where customers can purchase excellent food and drink and also stop and taste, look around, take cookery lessons and learn about seasonal products and the Presidia. It is a model that integrates the market, food, drink and learning.

Why this award? The idea was to give an award to those who - in recent years - have successfully embarked on unprecedented entrepreneurial adventures in our region, by creating projects in which the role played by design as a process is quite clearly an engine for the cultural and economic development of the region.

This territory, in particular, has given rise historically to extraordinary entrepreneurial events that have not focused exclusively on the creation of goods.

All too obvious, perhaps, is the case of Adriano Olivetti and his typewriter company founded in Ivrea in 1908.

Olivetti believed industry to be the linchpin of any modernization process in terms of economics but also in a social and civil sense: his industrial project closely related to social and cultural issues as well as including architectural and urban planning elements. We are also considering the idea of community; seen as an entity with undetermined geographical boundaries and economically self-sufficient, in which conflicts between society and industry can find an ideal re-composition.

Therefore, not only are they beautiful typewriters but they exert an influence at a number of levels in relation to territory, factory and civil society.

If the Design Processes Award had existed even 10 years ago, perhaps then we would have awarded the prize to the entrepreneur Marco Boglione, chairman of the clothing brands Kappa, Robe di Kappa, Jesus Jeans (and today also K-way and Superga), all brought together in the international company BASICNET (also listed on the Milan stock exchange). Boglione actually succeeded, at the end of the 1990s, in giving shape to a design process around a dot.com scenario, constituted by a network of licensees, a sales network and

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companies producing items of clothing, all located in different countries but linked via the Internet. The ethical aspect in this case is lacking; here the innovative and strategic element of design is paramount.

Today the prize is instead awarded to Oscar Farinetti.

We are in a completely different period to the end of the 1990s and the international crisis is a daily reminder of that. We believe that Oscar Farinetti today represents as much "planning ability" as "know-how". He has embarked in the last 30 years on extraordinary entrepreneurial adventures (from Unieuro - a chain of household appliance stores - to Eataly), capable of anticipating economic and lifestyle trends and revolutionizing some business processes which were considered to be rigid, not modifiable, such as those of the food sector, and creating cutting-edge communication formats.

The areas in which he has operated range from home appliances to the agri-food sector; the latter being a pillar of our economy today, the real wealth of the country. All this entrenched a historical era in which a new generation of young farmers, breeders and fishermen is taking shape, and the sense of respect for the land seems to be in constant growth.

OSCAR FARINETTI

He is ahead of his time, a visionary and an enlightened entrepreneur. He is above all a talent in terms of the large retail sector. He is not a designer. He was born in Alba (Cuneo) in 1954; the son of a partisan commander who, after the war, opened a pasta factory. From 1972 to 1976 he attended the Faculty of Economy and Trade in Turin, then to join the family business.

From 1978 to 2003 he was first a director, then chief executive officer and president of the Unieuro group (a store chain selling household appliances and - initially - also foodstuffs) which he sold in 2003 after opening more than 100 stores across the whole of Italy.

His life has been punctuated by significant corporate transactions: acquisitions of new brands, re-launches, diversification, sales. When technology and computers were bursting into daily life, he was trading in home appliances.

He invented some cutting-edge commercial formulas such as the so-called "everything must go", the first ever sales in the history of consumer electronics, but also the first sales by instalments, using the daily discount technique and loss leader products (sold at a low price). He had the intuition to implement interest-free financing, the idea of using goldfish to attract children and the 3 for 2 on mobile phones, based upon the type of offers which already existed in the food industry. In the meantime, the computer became indispensable and the mobile phone a necessity. What he sold was optimism; optimism became his commodity. To communicate this, he invented almost metaphysical advertising with Tonino Guerra, Fellini's great screenwriter but also a poet, writer and sculptor. He needed to find a different way of speaking about home appliances and technology; after all, even D'Annunzio had collaborated with the "La Rinascente" chain of stores.

Eataly opened in Turin in January 2007 after a long gestation period while every stage of the project was being implemented. After nine months it opened a sales outlet in Milan. Other locations in our region followed (Monticello, Asti, Pinerolo); the following year, a branch opened in Tokyo, then in Bologna. In 2010 it reached New York, close to the Flatiron Building, becoming an almost legendary location for Made in Italy food, and finally in 2011 in the old port in Genoa. In September 2008 Farinetti left the role of CEO to remain President.

ABOUT EATALY

Eataly was created by merging the words "to eat" and Italy.

Aim: to bring high-quality products to everyone, not just the select few. Business activities, being an entrepreneur, are at the heart of everything: the aim is to increase the percentage of people who think about what they put into their bodies, choosing top quality products. Eataly is aimed at a section of consumers. But it is precisely those consumers who are being asked to choose, to make eating an "agricultural act". It is a new concept: to offer the oldest merchandise in the world, food, in the form of a quality product, one which respects the environment, agricultural and manufacturing traditions of the territory. Oscar Farinetti's is not an intervention solely aimed at innovating the product (food, though of high quality); it is a strategic, wide-ranging action which completely changes the process (manufacturing, distribution and, more generally, the culture of food, bringing quality food to increasing sectors of the population) with significant positive impacts on the territory.

He designed a new, shorter product value chain by introducing new players, changing the relationship between who does what, reducing the flow of goods and the number of middlemen in the process.

In particular, he strove mainly to shorten the food chain: to give shape to a network of excellences, eliminating intermediaries, where possible, and buying directly from breeders and farmers.

The initial idea was to attract the world of small craft businesses capable of offering high level products, often unavailable or inaccessible due to price.

The second objective (almost reformist) was to convince the greatest number of small and medium manufacturers, farmers and breeders, to become ethical producers.

The aim was thereby to create a platform of agro-food excellence in order to obtain sustainable prices by containing the costs of the food chain and margins, offset by large quantities.

The brand now brings together a group of small companies which operate in the various food and wine sectors: from Gragnano durum wheat pasta to the mineral water of the Maritime Alps, from wine to Piedmont beef to the oil of western Liguria.

Also, and perhaps above all, the bread is of extremely high quality: prepared with natural yeast and organic flour and baked in a wood stove.

The finest raw materials are sourced in the territory; the next step is to communicate the

respect for tradition; finally, the aim is to educate about a way of eating that is as "healthy, clean and fair" as possible.

"Eating is an agricultural act" says the farmer and philosopher Wendel Berry. This message is displayed at the entrance to Eataly. Translated into economic language: demand leads the market. If everyone demands high-quality foods, manufacturers are obliged to produce high-quality foods. High-quality foods have never been offered using techniques of mass consumption by the hypermarkets that are known so well to Farinetti. He took the large size of the space, the freedom of choice and ability to change one's mind. On the other hand, he took, from the local markets, the informality and opportunity to chat between merchant and customer.

Why the first Eataly in Turin? Turin, the closest capital to Slow Food, the city where the Salone del Gusto (International Food Fair) is held and the sensitivity for a certain food and wine culture is at its strongest.

Eataly is generally presented as a format with some common features:

· wide open spaces, typical of large retail areas;
· presentation of food as a "living cultural asset": a challenge that every "Made in Italy" comes across when it faces globalization;
· informality of the environments (calling into discussion the concept, the perception of luxury);
· reasonable prices (in relation to quality goods);
· special offers;
· design of single-themed restaurants, i.e. specialist eating areas adjacent to the relevant department with service direct to the counter (a pillar of the Eataly format). Everything is established from a careful pre-design analysis: our way of eating in the last 20 years has changed, not the eating locations. The number of single people is increasing: social and informal eating areas are now favoured);
· process transparency: all stages of the process must be visible, with no secrets;
· the concept of honesty, the perception that no lies are told in that location;
· role of communication: never trivial or annoying. Very descriptive and informative. Simple and direct language: transmitted with irony and lightness; you chat, you talk about what you do.

Therefore:

1. on the one hand is the offer of the products (in the form of distribution and an opportunity to eat and drink);
2. on the other hand, learning, available in the form of cookery lessons, tasting sessions, courses on correct food preservation, lessons for children. This latter aspect is the most original component of Eataly and is fundamental in allowing the consumer to grasp the correct perception of quality.

Another important theme is the creation of contrasts; Eataly itself must become a place of contrasts.

Starting with the brand: the half moon, the way of embracing food, not closed: a fragment of the Turkish flag and the bazaars of Istanbul, the location which, more than any other, inspired him to construct Eataly. Even the opening of a museum on Carpano vermouth is an apparent contrasting element. Farinetti was able to secularize the Slow Food philosophy, bringing it closer to food produce. Slow Food acts toward Eataly as strategic advisor to guarantee an offer that always stands up to its promises. Last but not least: the relationship with the city: it also performs a public service, for example, food education lessons for children. A cultural and entrepreneurially significant operation. It remains a unique case study (much explored and liable to be replicated, sometimes badly): an exportable format but, above all, anti-cyclical, since the current crisis seems to have affected it only to a minimal extent.

BIO SKETCHES

ANDRÉ DESROSIERS

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Canadian born André Desrosiers came to industrial design after dabbling in engineering studies.

Simultaneously designer, contractor, industrialist, editor and professor, André Desrosiers' career defies labels. After graduating from the University of Montreal's School of Industrial Design in 1980, he worked as a designer for several design firms on a wide variety of products. He has designed office furniture, lighting, sporting goods, outdoor furniture, hand-held computers, luggage and other consumer goods.

In 1985, he became in-house designer for a local lamp manufacturer. He soon brought the design and sales directions of the company together. During this period, he was president of the Quebec Association of Industrial Designers.

Soon after, he launched his own manufacturing company in the field of water coolers. His innovative and award-winning water coolers met with wide commercial success, and his company, ADDICO, was one of the 25 fastest growing companies in Quebec. His products captured a dominant market share in Canada and were distributed in five continents. Having achieved his goals, he sold ADDICO in 1999 to pursue new challenges. André Desrosiers has coached several young entrepreneurs, helping them start their own businesses in numerous domains and regions: a water company in Senegal, a distributor of Canadian products in Latin America, an ergonomic seat manufacturer and a sportswear business in Canada. He also established a small editing company that develops decorative home accessories; acts as a design management consultant to several government organizations, including the National Archives and Library, the Montreal Congress Centre, Design Montreal and the Montreal Public Transportation authority; and helps small manufacturing companies in their business development. He studied anthropology at the University of Montreal for a few years before returning to design.

He has taught industrial design at the University of Montreal, and is currently a Professor at the School of Environmental Design of the University of Quebec at Montreal. His domains of expertise include Quebec industrial design and intellectual property. He has recently published a research on designers-producers in Quebec and will soon publish another on in-house designers for the manufacturing sector. He is particularly interested in the relationship between designers and business.

BRUCE STERLING
Journalist and writer

Bruce Sterling is an Austin-born science-fiction writer and Net critic, internationally recognized as a cyberspace theorist. Sterling studied journalism. He published his first book, *Involution Ocean*, in 1977. Sterling's writings have been very influential in the cyberpunk movement in literature, specifically the novels *Heavy Weather* (1994), *Islands in the Net* (1988), *Schismatrix* (1985) and *The Artificial Kid* (1980).

In 2003 Bruce Sterling became Professor of Internet studies and science fiction at the European Graduate School where he teaches intensive summer seminars. In 2005 he became "visionary in residence" at the Art Center College of Design in Los Angeles. Sterling has travelled the world giving many speeches and collecting awards too. For example, the Campbell Award in 1989 for his novel *Islands in the Net*, the Hugo Award both in 1997 and 1999 for his novelettes *Bicycle Repairman* and *Taklamakan* respectively, the Hayakawa Award in 1999 also for *Taklamakan*, as well as the Clarke Award in 2000 for his novel *Distraction*.

Along with William Gibson, another of the major figures of cyberpunk, Bruce Sterling co-authored the novel *The Difference Engine* (1990), a novel which is part of the steampunk sub-genre. Bruce Sterling published *Black Swan* in 2010, which has been critically acclaimed.

Bruce Sterling also founded the Viridian Design Movement, an environmental aesthetic movement founded on the ideas of global citizenship, environmental design and techno-progressiveness. Bruce Sterling's numerous book-length essays both question and promote how the future is shaping our concepts of self, time and space. In *Shaping Things* (2005), he offers a history of shaped objects, moving from the most rudimentary hand-made artifacts through to the complex machinery which defines our current existence. In *Tomorrow Now: Envisioning the Next Fifty Years* (2002), Bruce Sterling examines how today's technologies will affect our future lives.

Bruce Sterling's most acclaimed book, *The Hacker Crackdown: Law and Order on the Electronic Frontier* (1993), is a deep history of the birth of cyberspace, following the periphery of the development of technology from the first telephone hackers to the government's attack on several prominent hackers in 1990.

PAULO REYES

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Paulo Reyes graduated in Architecture and Urbanism at the Centro Universitário Ritter dos Reis (1987), and received a Master in Strategic Design at the Universidade do Vale do Rio dos Sinos (2008), a Master in Urban Planning at the Universidade de Brasília (1992) and a Doctor in Communication Science at the Universidade do Vale do Rio dos Sinos and at the Universidade Autonoma de Barcelona (2004). Professor and Researcher in Design at Unisinos. He has collaborated with some international institutions: as a Professor in the International Workshop "TE Tsab.05 International Summer Workshop" of Escola Tècnica Superior d'Arquitectura de Barcelona in 2005; as a Reviewer of a Ph.D. Program of the Politecnico di Milano in "Design and Technologies Exploitation for the Cultural Heritage" in 2006 and as an Evaluator in Research Units of Portuguese Foundation for Science and Technology of Portugal in 2007-2008.

CHRISTIAN GUELLERIN

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Christian Guellerin is president of Cumulus, the International Association of Universities and Schools of Design, Art and Media. Cumulus Association represents 189 schools of design, art and media in 46 countries. Created 20 years ago, Cumulus is now the largest international network dedicated solely to issues of education in design. It represents 3,100,000 students and nearly 30,000 teachers. The objective of this association is to exchange best practices in the field of education in design, creation and innovation. Elected President in 2007 and re-elected in 2010 for a second term, Cumulus has known under his Presidency a remarkable growth from 80 to 189 establishments, including in countries outside Europe. In 2008, he signed the "Kyoto Design Declaration", which reflected the new responsibilities of designers in the light of sustainable development issues. The association organizes two annual meetings and collaborates in many events.
He is also Managing Director of the École de Design Nantes Atlantique, which aims at training professionals for the creation and innovation for socio-economic development. Design is understood as an opportunity to generate added value and progress. Closely linked to business and socio-economic institutions, the École de Design Nantes Atlantique has structured its teaching about eco-systems "research-training-business" where

design is the interface between science (technology, economy and sciences) and projected scenarios for the future.

Design is understood as a technical discipline (Product ⁄ Interactivity ⁄ Graphics ⁄ Space) and as a discipline management socio⁄economic problems in 2008 with the opening of seven thematic Masters linked with business schools or engineering schools (double di⁄ploma). In 2011, the School of Design created the experimental laboratory "Readi" dedi⁄cated to virtual reality. In 2012, it created a laboratory dedicated to "new eating habbits". L'École de Design Nantes Atlantique in 2008 created a branch in China in Qingdao, which moved to Shanghai in 2010 and an office in Bangalore in 2009 in partnership with Shristi University.

Guellerin has authored numerous articles on design and pedagogy in France and abroad; he also teaches in several schools and universities in France and abroad. He has directed several projects for the establishment of schools of design or design centres in France and abroad on behalf of the European Union.

ANTONELLA PENATI
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Antonella Penati, architect, was born in Milan in 1965, where she graduated in 1991. In 1996 she earned the Research Doctorate in Industrial Design with a thesis on innovation processes, published by Etas in 1999 under the title "Innovation Maps. The change be⁄tween technology, economy and society". From 2002 to 2010, she was the Deputy Dean of the Design Faculty at the Politecnico di Milano where, from 2004 to 2010, she was the Chairman of the Industrial Product Design undergraduate course. From 2004 to 2010, she was also the Deputy Chairman of the Italian Conference of Design Faculty.

From 2002 to 2008 she was responsible for the research group "Research and Education in Design" of the INDACO Department at the Politecnico di Milano.

Her main research area focuses on design as a dynamics engine of the socio⁄technical in⁄novation and interpretation of design processes as an activity for growth, transmission and dissemination of new knowledge. Regarding this last issue, she has promoted research on design education, on the nature of knowledge that takes place in the project activities and the way of its codification and transmission.

Her contributions on this theme are: Antonella Penati and Alberto Seassaro (eds.), *Didattica&design. Processi e prodotti formativi nell'università che cambia*, Poli.Design, Milan 2000; Antonella Penati (ed.), *Giovane è il design. Nodi contemporanei della didattica per il pro⁄getto*, Poli.design, Milan 2001; "Design as a Systemic Activity: Elements of Construction

Problem in the Interpretation of Training Models in Design Education", in *Strategic Design Research Journal* (2010); and the co-editing with Di Lucchio of the *DIID Journal* double volume, "Vitamins for Design", dedicated to research and education in design (2010).

CLAUDIA DE GIORGI
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Claudia De Giorgi, architect, researcher, is specialized in materials design with a "human centered" approach, focusing on real human needs: functional, relational and perceptive ones. The aim of this approach is to innovate products by deepening contents and knowledge about project materials. This knowledge is focused on materials and innovative processes (or new use of materials and traditional processes) and their possible uses.
The approach can be applied in research-action operations, design and teaching analysis and can be applied for other activities too, such as analysis, monitoring process and guidance for the industrial and artisanal design system in Piedmont.
Curator of Piemonte Torino Design exhibition, scientific director of private researches about new sustainable and expressive ways to conceive products and processes, she is also founder and scientific director of MATto, archive of samples of innovative materials, an available archive consisting of over 500 samples of materials recently introduced on the market, with technical and sensory charts.

MARCO TORCHIO
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Keo S.r.l. is a dynamic design company composed of professionals from various backgrounds - researchers, architects, engineers, eco-designers - who fully maximize the experience of different areas in order to keep up with the fast evolution of technological discoveries. Set up in 2005 in Savigliano (Piemonte region, Italy), Keo follows the principles of ethical economics and promotes sustainable projects both from the economical and environmental point of view.
Keo's mission is to propose solutions united with eco-design, eco-architecture, eco-engineering and eco-communication. Keo uses the market to create richness in an ethical way by applying the principle of environmental sustainability together with sustainability of

economics. Keo designs, engineers and communicates sustainability.

Sustainability is becoming more and more a selling point. Keo provides true sustainability, verified by accurate numbers and data ⁄ according to the Life Cycle Assessment theory, measuring the environmental footprint of a product or a process ⁄ and not sustainability based on catchy slogans. This does not simply mean making a process more efficient or cleaner to the detriment of someone else, in reality transferring the pollution in space and time. Instead, it means creating an environmentally friendly path, which coherently con⁄nects research, production, distribution, sale and consumption patterns. It is a path consist⁄ing of real information concerning the advantages and disadvantages of each eco⁄alternative. Scarce resources, energy crises, millions of tons of unused waste: the present production and consumption system is in trouble. Keo's vision is different: together with the first and fun⁄damental condition of economical sustainability, Keo's solutions respect the criteria of en⁄vironmental sustainability and social equity. Nowadays a project is worthwhile, also from an economical point of view, only when social and environmental aspects are safeguarded.

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Architect, Ph.D. in History of Contemporary Architecture and Town⁄Planning. He is Assistant Professor at the Politecnico di Torino (Industrial Design Degree) where he teach⁄es Theory and History of Systems Design.

He is currently working on several research projects concerning the history of sustainable design and entrepreneurial culture. He worked in several national and international archives such as the Rockefeller Archive Center in Tarrytown (USA), the MIT in Cambridge (USA) and the Archivio Storico Olivetti in Ivrea. Member of the ADI commission for the selection of theoretical, critical and historical books and essays in the field of Design.

He authored the book *Outdoor Design dal 1870* (Electa, Milan 2010), *La ricostruzione domestica* (Celid, Turin 2005) and was co⁄editor of *Design e Corporate Image. Per una storia dell'identità visiva nazionale* (Franco Angeli, Milan 2012) and the *Proceedings of "Changing the Change"* (Allemandi, Turin 2008), an international conference held as part of the Turin World De⁄sign Capital event, focusing on design research for a transition towards sustainability. He is the co⁄editor of the series *I Testimoni del design (Witnesses of Design)*, Umberto Allemandi & C. and *PlayDesign*, Electa Mondadori. He has written many articles on industrial and vis⁄ual design, multimedia, architecture and didactic issues published in important magazines and newspapers (*Strategic Design Research Journal*, *The Art Newspaper*, *Elle Decor*, *Il Giornale dell'Architettura*, *Il Giornale dell'Arte*, *Op. Cit*, *Il Riformista*, *L'Unità*, *Giudizio Universale*, etc.).

PAPERS[1]

STRAND 1
THE RELATIONSHIP BETWEEN EDUCATION
AND COMPANIES

HANDCRAFT, COMPANIES AND EDUCATION.
REFLECTING ON THIS PARTNERSHIP IN THE PORTUGUESE CONTEXT

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Design schools are herein presented as privileged local vertices, parts of a global brain, that is, as centres that accommodate research which is articulated with local culture, tangible with the observation of craftsmanship in dialogue with design's performance.

Bearing this in mind, we present some research and teaching experiences in Portugal, through emblematic micro experiences articulated with the practice and knowledge that find their value in craftsmanship ⁄ Old Knowledge. New Tendencies; Lightness, Reanimating the Filigree; 2nd Skin Cork Jewellery; Meanings of Matter in Design, Alentejo ⁄ which have allowed the translation of the traditional knowledge of certain places and its conversion into reality. Liliana Guerreiro and Corque Design are successful companies that combine the work of a designer with craftsmen, taking advantage of the idiosyncrasies of a local dialogue which is extendable to a global world.

In this study, the articulation of craftsmanship with the teaching of design is regarded as a place for positive experiences, in the sense that this articulation produces a vector directed to the amplification of cultural values, to the underlying *genius loci* in places. The study of these experiences has confirmed the existence of an excellent opportunity built on the fact that craftsmanship in Portugal is a positive practice, implicitly and historically associated to the nature and construction of its places.

This is a reality that can be observed and perceived by a significant portion of Portuguese production, also materialized in the industrial manufacturing clusters. This production, despite being considered frail in its organizational and economic structure, consists of small workshops, sometimes informal ones, of low technology but high quality in its

manual work, where knowledge is conveyed through generations.

In this context, the aforementioned experiences are evidence of a strong dialogue between designer and tradition; a dialoguing experience with local manufacture is expressed through innovative products.

Whilst presenting these experiences we shall conduct a critical consideration, trying to understand the difficult dialogue between design, craftsmanship and the valorization of the territory.

••• Meta-design, craftsmanship, cultural diversity, experience, company •••

INTRODUCTION

The present paper aims to study the association between craftsmanship, companies and the teaching of Design in Portugal. It results from an ongoing research, part of the doctoral program in Design at the University of Aveiro, entitled "The sense of Place. Valorization of territorial identity through design." In Portugal, the discussion around the promotion of values inherent to the territory uses traditional materials and knowledge in relation to contemporary industry as reading keys.

In this context, design schools are seen as strategic and privileged places used to foster an investigation articulated with local culture, tangible with the observation of craftsmanship's practice in dialogue with design's performance.

On a cultural perspective, the integration of craftsmanship themes in the teaching of Design seems particularly pertinent in Portugal, as this practice is historically tied to the nature and construction of its places. As we have mentioned before, this is a reality perceived by a significant portion of Portuguese production – probably being the prevailing economic system in Portugal, as referred to under *craftsmanship* in the *Grande Enciclopédia Portuguesa e Brasileira* – also materialised in the industrial manufacturing clusters.

From a socioeconomic point of view, it is important to salvage the idea of craftsmanship as a support activity to entrepreneurship and the idea of it being implicitly, in its form, part of a micro economy; these features are currently referred to in several areas of knowledge (Manzini, 2008; Santos, 2007; Sassen, 2010; Câmara, 2009) essential to the valorization and sustainability of the territory. The flexible, mobile and precarious nature of work relations that characterizes jobs in the second modernity is also a distinguished feature of craftsmanship as a traditional-rural craft.

TERRITORY AND CULTURE

The fragmented and dynamic territories of our days – a result of the acceleration of our perception of time through the exponential increase in speed at which information, goods and services travel as a result of globalization – are impatient and require swift action. There are constant social, ecological and cultural changes. Being that everything is urgent,

pinpointing specific problems will enable swift action towards the valorization of territory, promoting local identity, with the purpose of making them alluring to people, enabling their social, economic and urban regeneration.

We perceive territory as a self-projecting *living being*, as a reflection of its history, culture, politics and economy, understandable solely in relation to society, that is, to people. Hence, the territory is, in this context, a place for civilization. The metaphorical idea of a *living social organism*, in which each inhabitant produces micro-impacts, states or positions the territory as a communicating body.

The challenge faced by cultural policies in our fast changing society, inhabited by an abundance of different cultures, is not that of the enhancement or narrowing of identities, but rather the challenge of taking advantage of its heterogeneous nature and the variety of messages within, enriching sociability whilst giving added value to difference.

The value of identity as a living thing, as an ever creating process is emphasized; a set of features that identify a community and a territory making it unique throughout time.

Here culture is introduced and seen as "(...) not that which is given by nature, but whatever is built by man; it should logically include industry, as well as media, the processes for producing rubber ducks, as well as the ways of love-making and amusement" (Eagleton, 2003, 51). One being to looks upon culture as a living set of actions that includes every practice or activity regarding the transfer of knowledge, and common beliefs of a society or social group in particular. A complex system of sector knowledge transfer which overlaps, resulting in added value, as underlined by Bauman (1989, 315) as he says that "people are whatever they are taught to be."

According to the author (Bauman, 2011), Europe can be seen as a geographic area, as a political entity and, especially, a cultural reality where the greatest asset is diversity. These differences today, with crossed diasporas of immigrations, of differences between myself and the other, of neighboring. In Europe, the other is always present, like nowhere else and, as such, European culture knows no rest.

If living with difference is an inherent quality of Europe, it makes sense that material culture also reveals such differences, and that design is a reflection thereof. According to Andrew Blauvelt (2011, 13), we are "living in the age of relational and contextual design". If there is no hegemonic culture, it makes no sense to mass produce goods.

In contemporary reality there is a tendency towards the homogenization of the concept of global as we close the gap between cultures, and we increasingly believe that local differentiation is essential to the identity(ies) of places. Therefore, the idiosyncrasies of places are of key strategic importance to the contemporary ways of life (Sassen, 2010.) In this view, we should look for idiosyncrasies, the differences that make places appealing to people. The study of local history, heritage and tradition plays a major role in our days, placing tradition at the core of what is inherent to the territory, as a feature enabling the differentiation of places (territorial and social), through their *translation* (Flusser, 2010) to contemporaneity.

FIG. 1. LOCAL DIFFERENTIATION | GLOBAL HOMOGENIZATION.

TERRITORY, DESIGN AND SUSTAINABILITY

Portugal, in relation to Europe, is a very heterogeneous country known for its cultural, geographic, social and economic diversity (Barreto, 2007), where the available resources aren't always exploited in a sustainable, ethical way or with the desirable economic visibility that one would require to generate wealth for local communities. "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987, in *Preamble of the Earth Charter*.)

The environmental sustainability of the territory also depends on the sustainability of companies, which, in turn, enable not only the sustainability of their products but also that of the country's development. Each place is a specific combination of particular modes of production (Santos, 2007.)

A significant part of Portuguese production is the work of small manufacturing industries, which bare a close resemblance (or sometimes none at all) to handcraft production. Such production is very frail in its organizational and economic structures; it is small scale, made of small, low technology workshops where manual production of great skill predomi-

nates – the old manufacturing techniques are still quite present in Portugal. We feel it is appropriate to state that 95.5% of Portuguese industry is a small scale business with less that 10 workers, amounting to 43.3% of the total industry workforce. These industries are small manufactures where, as noted above, the work process is very similar to handcraft. Medium scale industry in Portugal amounts to 4.2% of the total and employs between 10 and 249 workers. Only 0.3% of Portuguese industry is large scale, and it operates in the energy sector. (Rosa, Chitas, 2010.)

As Portugal is a country with over eight centuries of history, with a diverse and rich cultural legacy still identifiable in its territory, but poorly industrialized, the aim will be to enable its productive processes without turning to sophisticated and pompous technology, lending added value to traditional knowledge, manipulating memory, matter and technique. That is, to innovate through those traditions, creating difference from a place's reality, enabling the diversity of senses in places of a global world, capable of reflecting "universality without totality" (Canclini, 2008.)

If, by definition, Tradition is the oral transmission of facts, legends and so forth, across generations, that is to say, the act of "delivering, transmitting; delivery; transmission; teaching; relation; narrative; mention through erudition", according to the *Dicionário Etimológico da Língua Portuguesa, Livros Horizonte* (Machado, 1977), and if Craftsmanship is the "manufacture of objects with local raw materials, produced by one or more craftsmen with the aid of their families in a small workshop or in their own house, with the aim of selling or trading them; (…) from the French *artisanat*" as detailed in the *Grande Dicionário de Língua Portuguesa* (Teixeira et al., 2004) we can thus infer that Craftsmanship is any mental production that precedes drawing, part of an economic activity that promotes difference and the representation of traditional experience.

"The experience of tradition is one which gives us a sense of belonging, because, as with our native tongue, it is gradually acquired without being explained to us" (Rodrigues, 2007, 6). Design as a cultural mediator and agent for a semantic reassembling of local culture, is identified in this context as meta-design, as a communication mediator between an inherited past and the construction of a desired future, reorganizing the values of traditional knowledge restoring their meaning in contemporaneity.

We believe to have thus justified the relevance of design as a discipline adding value to contemporary productions, making use of craftsmanship knowledge.

META-DESIGN, CRAFTSMANSHIP, EXPERIENCE AND COMPANIES

From this perspective, and as we limit our research, we believe new work methods can be found, combining craftsmanship and design, with the ability to adjust ancestral knowledge to contemporary reality, in a way that such a relation may be established as a strategic axis in the valorization and development of territories. Our aim is to identify some features and procedures contributing to the creation of knowledge multipliers, leading to

the renewal and development of technical and human work conditions, as productive and organizational work processes characteristic of each place or region, adapting them to the needs, desires and values of new audiences.

We aim to create a useful model to approach the valorization of territories, promoting the implementation of projects in Portugal – with the possibility of application in other territories –, in which design functions as a translator to traditional knowledge, namely, of craftsmanship in contemporaneity.

In this context, we wish to understand how the teaching of Design in Portugal has been promoting and amplifying knowledge connected to the ancestral/pluri-secular Portuguese crafts, creating and embodying this territory's cultural "diversity", which are necessary to the survival and sustainability of Portuguese contemporary industry in the fragmented context(s) of our contemporaneity.

In Portugal, we can find thirty four schools that teach design. In the last decade, some of these schools have been developing projects that valorize the territory introducing, in their curricula, exercises that aim to look closer at the territory, introducing craftsmanship as a theme and, sometimes, even establishing partnerships with companies in Portugal.

By introducing craftsmanship in Design curricula we promote the act of cultural interpretation, which, in this particular case, represents: from an aesthetic point of view, the differentiation of handcrafts; from a corporate point of view, entrepreneurship and autonomy; from an economic point of view, the use of scarce resources towards the provision of goods to satisfy human needs; and also, from a technological point of view, the mastering of techniques. We can also point out that, from a corporate point of view, craftsmanship is also the ability to, in an autonomous way, identify a need and find the skill to produce a solution to quench it.
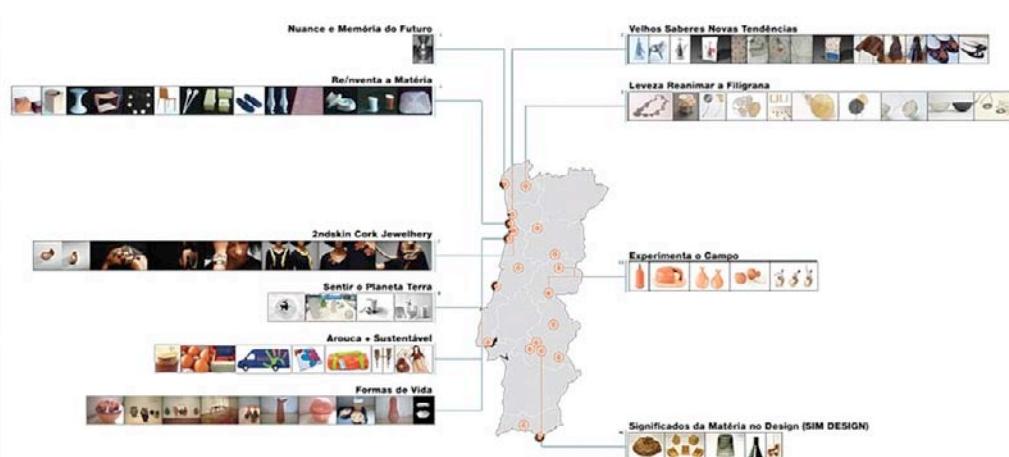

FIG. 2. DESIGN TEACHING EXPERIENCES IN PORTUGAL. CRAFTSMANSHIP AS AN AGENT LEADING TO A PRACTICE.

With this in mind, we would like to list some experiences of research and teaching featuring the theme of craftsmanship: *Nuance and Memory of the Future; Re/vent the Matter; Feeling Planet Earth; Arouca + Sustainability; Ways of Life; Old Knowledge. New Tendencies; Lightness, Reanimating the Filigree; 2nd Skin Cork Jewellery; Experience the Countryside; Meanings of Matter in Design.* All of these enabled the incorporation of traditional knowledge of certain places, and its translation to the present time.

We would like to highlight two of these experiences: *Lightness, Reanimating the Filigree* promoted by the Escola Superior de Artes e Design (ESAD) of Matosinhos and *Meanings of Matter in Design* promoted by *SUSDESIGN*, that generated two successful small companies, founded by two designers that became entrepreneurs in the Portuguese industry while
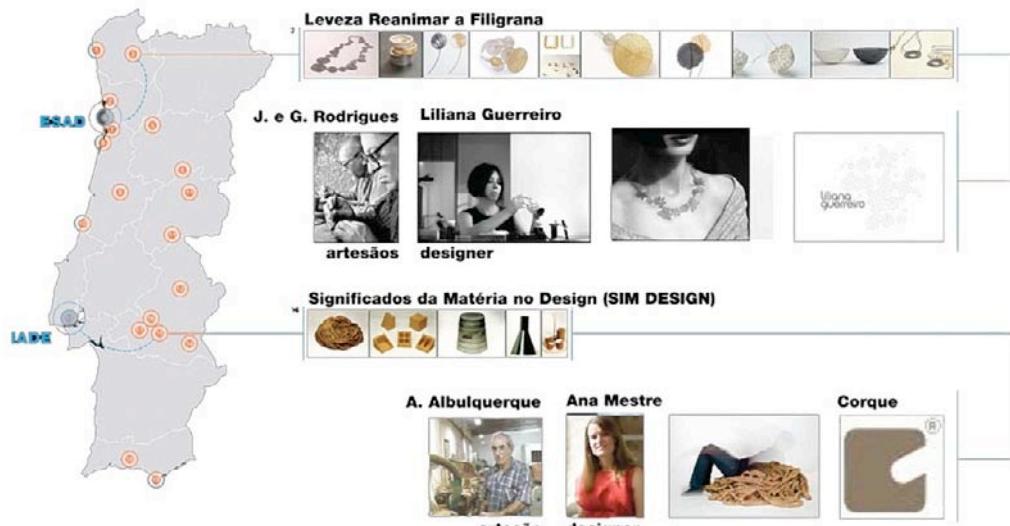
FIG. 3. FROM EXPERIENCES TO THE CREATION OF TWO COMPANIES: LILIANA GUERREIRO AND CORQUE.

enjoying the idiosyncrasies of a local dialogue extendable to a global world.

Lightness, Reanimating the Filigree is a project developed within the scope of a degree in Design | Jewelry of the ESAD – Matosinhos, in the year of 2002, lead by the teacher and designer Ana Campos in coordination with the Museum of Gold of Travassos, located in the municipality of Póvoa do Lanhoso, in the north of Portugal. "The ESAD, working with the art/design interface introduced new project propositions leading to the serial production of works that made it possible to have an itinerant exhibition. The Museum of Gold acted as a mediator between the traditional practice of local smiths and the increment

of current design. Working together, the aim was to reinterpret and revitalize the filigree, trying to boost the production of the Póvoa de Lanhoso smiths, to show how rooted it is in Portugal. (...) This project was pursued according to what Augé calls *overmodern thought*, questioning the current consequences of the over dimension of distinct features of moder‑ nity, considering that the foundations for the introduction of new creative dynamics can be found in the memory of Humanity, working with it and recycling it, transforming it in a material that can be used to build projects." (Campos, 2004, 10).

FIG. 4. ARTIFACTS PRODUCED BY THE LIGHTNESS, REANIMATING THE FILIGREE EXPERIENCE.

Meanings of Matter in Design, Alentejo is a project that started in 2004, in line with the Design for Sustainability program, promoted by *SUSDESIGN*, with the purpose of developing research, design and training involving several players: designers, craftsmen, re‑ searchers and the academy. This project began with an exploratory research into: three re‑ gions – Estremoz, Évora and Montemor‑o‑Novo –; materials – clay, cork, wicker, wood, rock, tin‑plate –; techniques used by craftsmen – pottery, cork work, basketry, joinery, rock work, tin work ‑ enabling, through the manipulation of matter and techniques, the sustainable development of new products, in such a way that they may contribute to the well‑being of people. (Ruivo, Diehl, Mestre, Parra, 2005.)

FIG. 5. ARTIFACTS PRODUCED BY THE MEANINGS OF MATTER IN DESIGN EXPERIENCE.

The experiences above are the expression of an intense dialogue between the designer and tradition; a dialoguing experience with local manufacture is expressed in innovative prod‑ ucts, using traditional knowledge or pluri‑secular traditional materials in its production procedures. The *Liliana Guerreiro* brand was born from the *Lightness, Reanimating the Filigree* experience, and the *Corque Design* brand from the *Meanings of Matter in Design* experience. Both companies make use of design as an assembler and driving force for knowledge useful to the valorization of the territory, rescuing and innovating its languages through material

culture, through the reinvention of small scale, of local artifacts, reinventing them in dialogue with the demands of a global market.

FIG. 6. HANDCRAFTS WITH FILIGREE – PORTUGUESE TRADITIONAL TECHNOLOGY – BY THE LILIANA GUERREIRO COMPANY.

FIG. 7. HANDCRAFTS WITH CORK – PORTUGUESE TRADITIONAL MATERIAL – BY THE CORQUE COMPANY.

Liliana Guerreiro and *Corque Design* produce their work exclusively in Portugal. Both companies are privileged to have their work chosen for the MOMA in New York and it is currently on sale at the museum's shop. These companies represent, however, different realities regarding the integration of materials and traditional knowledge in the industry and the approach to markets. Liliana Guerreiro, designer in the company with the same name, still works around the workshop theme and with the Travassos craftsmen, and has established herself in the market through the development of new products, translating into contemporaneity the traditional Portuguese filigree jewelry. These products were very well received by the Portuguese market, allowing the creation of a company arising from the need imposed by product sales.

FIG. 8. ARTIFACTS PRODUCED BY THE LILIANA GUERREIRO COMPANY.

Corque Design has established itself on the market through the development of products using cork. This brand derives from *SUSDESIGN*, a company promoting design research and the development of products. With the *Meanings of Matter in Design* experience, the designer Ana Mestre realized how cork could be used as a raw material in the creation of new products, finding new ways to use cork, of which Portugal is the largest worldwide producer.

FIG. 9. ARTIFACTS PRODUCED BY THE CORQUE COMPANY.

The *Liliana Guerreiro* company was founded following a sale success. Today, 60% of its production is absorbed by the Portuguese market whilst the remaining 40% are absorbed mainly by Spain, Switzerland, Austria and growing in Germany, Hungary, Belgium, England, Japan and the United States of America. Liliana Guerreiro says that only now is she thinking about her business as a company and that she should have started sooner, in terms of promoting and creating distribution networks. The company is comprised solely of three workers, being one of them the designer, Liliana Guerreiro. The remaining two workers craft the products and were trained by the company. It is based in Paredes de Coura and still works in association with two craftsmen in Travassos.

Corque Design was founded in 2009, as a brand of *SUSDESIGN*. The company, comprised by five workers and based in Lisbon, is in charge of the production, research and development of cork products, which either the company creates or outsources. Presently, fifteen companies, all north of the Tagus river, are producing *Corque Design* projects. The company was founded under the clear idea of the need to have a brand in order to develop products. *Corque* also promotes the distribution along with commercial agents. The network of production and distribution is very important at *Corque Design*, a company that clearly positions itself in the global market exploring and lauding a material, looking for the best partners for each step of the process. Currently, 70% of its production is absorbed by the foreign market, namely in Finland, England, Belgium, Spain, the United States of America and Japan.
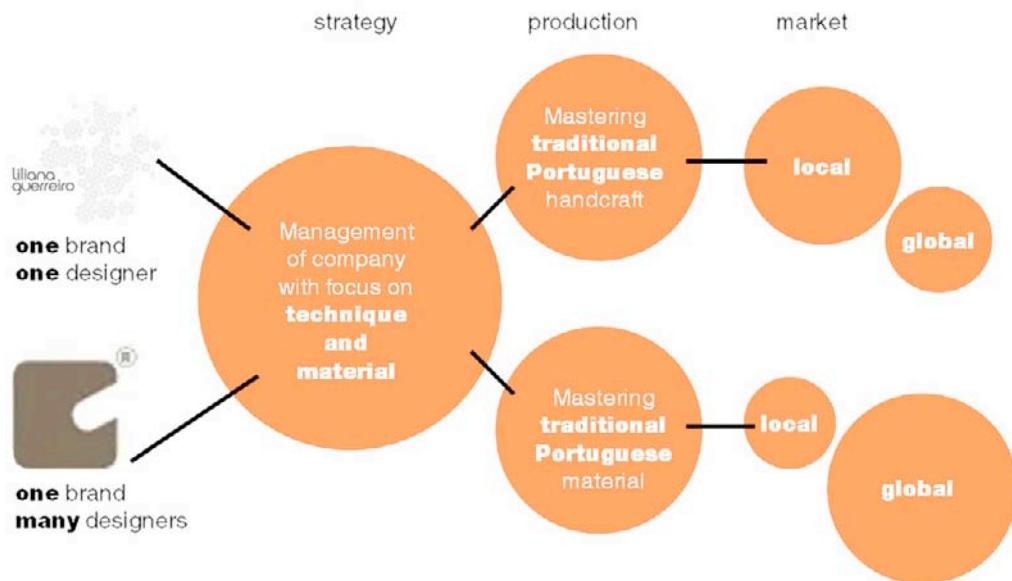
FIG. 10. STRATEGY, PRODUCTION AND MARKET FOR BOTH COMPANIES: LILIANA GUERREIRO AND CORQUE.

FINAL REMARKS

In both study cases, design is taken as the uniting force of a complex process, of innovating with tradition, trying to add readability and intelligibility to the territory, building narratives shared by all players, who redefine the territory enabling its reading, comprehension, translation and representation.

These examples showed us that, through creative intelligence, culture can be used to research and innovate, conceptually and technologically, to create with the aim of constructing and making cultural contemporary products, which are desirably related to a material and immaterial heritage. They also showed us that it is possible to use traditional knowledge and materials to explore a contemporary presentation of traditions, and that the designer, as an author, transcends his or her function as an interpreter and translator, and builds his or hers representations, presenting them in models, which, in turn, will be themselves interpreted. Hence, both material and immaterial aspects are involved in tangible and intangible variables which, as a whole, are condensed in relation with the territory itself, shaping experience, conditioning it and possibly taking it to a memorable status.

These two study cases show that the mastery of ancestral techniques and their flexibility can, within the current local and global framework, be an opportunity to regenerate, recover and upgrade the Portuguese industry, as nowadays the demand is for a great flexibility of production. However, they are not representative of the professional choices of Portuguese young designers entering the labour market, as the majority lacks initiative and entrepreneurship.

According to 2011 data from the Associação Nacional de Direito ao Crédito (National Association for the Right to Credit), in Portugal, craftsmanship and decorating is the fourth economic activity of micro-business, amounting to 8.1% of all Portuguese micro-businesses, whilst designers, architects, painters, sculptors and other professionals coming from a Fine Arts School amount to only 1.9%.

This approach aims to contribute towards an ongoing research, whose ambition is to decode a dialogue of processes in which the designer interacts with the features and nature of local knowledge, in the form of craftsmanship. It aims to combine its pragmatic, performance, programmatic, open, experiential, participative and collaborative features, already claimed by design as its own defining and striking features.

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DIDACTICS FOR INACCURACY. THE TEACHING OF DESIGN FOR CRAFTS

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Concatenating the aspects which characterize an authentic craft production with teaching practice focused on the teaching of design is one of the current challenges proposed by several teachers and researchers involved in design actions for crafts. The practice of design nowadays is presented notoriously more opened to what it means to develop a product. From the object design we start considering the productive system as the stronghold of the main aspects which impart values to the products, now tangible and intangible. Taking into account the handmade aspect of the productive system considered here and the technical criteria in the teaching of design, the place of our pedagogical challenge is in the intangibility of the humanist criteria.

••• Teaching, vocational training, craft and intangibility •••

The interaction between design and craftsmanship is already a reality to be considered in design education, based on market demand for products that are different for their new values. Considering the rapid acceptance of these products, it is necessary to adapt the ways of acting, as well as classical procedures adopted by the academy in design education. The design which is an activity of planning and innovation has its training based on the industry development. Its practice used to refer to design process fundamentally, characterized by linear procedures based on technical aspects mainly. At that time, the industrialization focus was on the economic development trough a democratization of the consumerism. So, it was necessary to lower the costs of production which implied the productive process optimization and materials and technologies research and development.

 As this essential phase of materials and productive process from industrial basis which was situated punctually the design activity has elapsed in the society then named post-industrial, the access and management of information and knowledge are recognized as determining design procedures. Contents form the most varied areas come together now and are added to the productive and technological process.

The design activity starts to act more systematically and to plan the product extending it

strategically to its production and value chain. Attributes as certification of origin and territoriality once considered as secondary came to the forefront, this fact has been promoting craft production or rather the artisanal basis production marked by productive peculiarities, a counterpoint to the local and global relation established initially in the industrialization process (Burdek, 2006; Cardoso, 2004). The consequences to the design are new opportunities and challenges.

The craft is characterized by the manual production of artifacts which seek to be different by its social and cultural peculiarities and productive techniques. It uses raw materials and traditional techniques associated to the territory and cultural flows of its training. The craft production is linked to its manufacturing, usage and custom. Its innovation comes through the craftsman experiments which seeks continuously his process improvement. We could consider two basic forms of craft-based production – a induced and spontaneous character (Freitas, 2011).

The induced craft is mainly characterized by the way of production established to serve the generation of employment and income demand. In the current socio-economic scenario it is increasing the number of people who has dedicating themselves to this activity as a way of subsistence. However this production is sometimes devoid of aesthetic and cultural value. There are some cases which is a matter of improving the technique using the raw material available and putting in the market as a lower cost product option. The necessity of this type of production is recognized by its fast development facilitating the solution of income generation. The craft is develop by the presence of a designer who creates the production for the artisanal production. in general, this products bring professional experience as the usage of new materials, the mix of techniques and product format adequate to the design market. This production could or not be bound to traditional patterns,

In the induced craft the compromise to the market remains, and the sales as it follows. Generally the attention is focused to the optimization of the production process. The experience lived in this kind of production is simply associated to the production and commercialization. There is no interaction to the process and no sentimental value to the product. This craft is generally done from the interventions of institutions which seek to answer the necessity of income generation or promotion. The action methodologies pass through technical capability product development which has easy market acceptance. Sometimes those products are associated to designers, artists or institutions which facilitate the commercialization through brands association. These craftsman are linked to the product by the commerce bond, while that product is been sold he might keep producing but also replace it anytime, with no emotional bond.

In the spontaneous craft the traditional character remains, which holds, enrich and reinforce itself by tacit competences according to what the productive context allows and preserves. Craftsmen create and produce with established criteria in a traditional way – handmade functionality, perfection and technical originality, local aesthetic coherence.

They work with the production satisfaction as a continuous process. The attention is to the product mastery in quality and process. There is no external interference in the creation. In this type of craft it is called our attention to the quality of the craftsman and productive process connection. The bond between the craftsman and the product is real 'the satisfaction which the result offers inspire the ways of reaching it' (Mills, 2009). In this process the craftsman is free and modifies his creation according to his experiences and particular necessities. He learn through the process. The process of producing brings experience and ability which he keeps improving and modifying when it is necessary – the process and methodology of work. The work evolution goes in parallel to the person's evolution. The work quality is the craftsman quality of life. There is not distinction between work and leisure, this way there is not between product and culture also. The work to this craftsman is essential to his life, he does not need to look for subterfuges to rest or leisure, because his work fulfills and reveals as a being.

To the reflection presented, our focus is to this craftsman who works under premises of the identification with his work and the comprehension under the process of production as a natural act without further explanation, but naturally endued with methods and rules. In the spontaneous craft the work continuity happens by the personal satisfaction of the production and not by the commercialization. The challenge then, is how to do make this type of craft an economic activity without losing its affective bond with the craftsmanship. We understand that to the form of production which characterizes the spontaneous craft, the focus of the academy should be intensified, because the intangible aspects are bigger than in groups which produce crafts but dissociated from the emotional value with the product.

To keep the integrity of the artisanal production processes is a step for being able to do the interaction of the craft and the design, without letting the craft in disadvantage in this relation. According to Chili (2003), one of the characteristics of the craft is the typicality, an element which could not be disassociated to tradition and culture. If we are talking about designers' intervention in the artisanal sector, we should keep the integrity of each of these parts concepts, therefore the hybridism conquered after this union will be producing.

The design as much as the craft are circumscribed inside a major plan, the cultural which is does its interrelations to the man, time and space, it becomes impossible the sterile reading of each one of this concepts. This way we understand this is the utopian reality, though as ideology, it should be pursued, so that the minimum own value from design and craft are kept in order to the existence of possible questionings and or comparisons.

The fact that we comprehend the study of design and craft is in an intersection area between even concepts, but distinct makes us think over how to keep the integrity of each design areas and artisanal culture in their simple forms without interferences. So that in the intersection process the sum of individual values could compose a new scenery.

The focus of one design action to the craft is not translated only by the final product, but

also by the process that can be viewed as a counterpoint which has still prevailed in the educational background for the design activity whose methodology is still based on technicality character intrinsic to the industrial process (Cardoso, 2004; Burdek, 2006). In face of the fundamental importance of the design flow, the stages travelled gain analysis extent, since this case is not a matter of a project of product anymore, but of the scenario which holds its production chain. And now, not only production of goods for exchange but value also. Value is not only economic but social and cultural character as one of the fundamental aspects to guarantee the relationship of sustainable actions in fact.

To the design action for the craft there is not a formula, and even less static which could develop products or sustainable process as in economical as cultural view. But what could be emphasized is the necessity of flexibility in means of being attentive to the group, territory and process already established.

We could highlight two main moments to be considered by design in this interaction to the craft: productive actions diagnosis and implementation.

The diagnosis, also considered as a mapping, local acknowledgement or approximation stage, is characterized by exploring and integrating to the territory. The main aspects which involve this stage are: to understand and to identify the productive techniques, to identify products typology and local resources associating them to the local economical, historical and socio-cultural context. It is in this moment which is established the relationship with the steakholders.

To the diagnosis realization, the obtaining of generic information is relatively easy since the accessibility provided by current means of communication. These are facts which will contribute to the establishment of investigation script in field, and more effective result when it is done as a brief immersion.

The emphasis in this stage is in the adoption of participative methods to the establishment of actions. The search is for the cohesion as to the process as to the people involved. The human factor should be considered cautiously because it deals with handmade products carrying meanings which go beyond the usage and form. It is this moment necessary to point out values reflected in the products which could be represented by human, cultural, raw material aspects and mainly imprecision of the process.

The action research is a participative method characterized by the collectivity, very used for example in projects promoting design actions to operate with productive craft groups (Freitas, 2011). The main conduct is the integrated construction of a plan in consensus to the main actor involved, the craftsman. In the craftsman repertoire prevails and highlights the tactile knowledge of the productive process and the process covered. The orientations and possible design considerations should be done in a way that the craftsman experiments are translated in more knowledge, indulging the internalization of new concepts.

The coherence should be a sum of precepts and attitudes which indulge the integrity of all involved aspects, being cultural values or in the correspondence of executed proposals or

in the postures and methods used adequacy. However this is not static. It is important that the planning and the actions are in permanent evaluation to the adaptation which runs in the evolution of objects and expectations, comprehending the different necessities in each situation. At last the consensus proposes an agreement between the parts grounded in clear and precise objectives.

In many case studies and performances executed in the field with the productive communities, it was observed the designer action to the craftsman is considered training. If we understand that 'it only could be trained in what is already known, the training sometimes incapacitates to learn new ways!' (Mills, 2009) this training tends to be limited by knowledge already pre-established and experienced by groups. In other way, if we work this practice as an interactive way, which the mutual experience of the involved ones will be optimized, the work will be more enriching , because there will not have limit to the generation of knowledge.

Under the educational background prism, we should think about how to establish this contact with exemption, as far as possible, from the design and its ability to indulge and facilitate the craftsman expression in his different languages. According to this thought, begin the concern of teaching didactics which enable the design students to connect these new work perspectives, interpersonal relationships aspects, educational training process of crafts, creation process and development of products beyond academic design practice and others. Considering this new context of design performance the academy needs to be attentive to the didactics aspects which differ from those applied so far with focus on the productive industrial context. The first is that the craftsman should be viewed as a exchange subject of knowledge, which both designer and craftsman are being enabled. It is a set of process of building knowledge.

Aspects as language adequacy to the target public, discernment about opportunities interference or a explanation which escapes from the conventional didactics planning, are acquired in a tactile form, that is by experience from practice. In view of several intangible aspects relevant to this didactic profile, the questions is how to approach them in the design teaching.

The opportunity signalizes to the possibility of availability of discipline options to the design student with his focus on the intangibility circumstances which are highlighted as artisanal production values as ethnography, anthropology, history, ecology, and others. These are examples of disciplines which could help to extend knowledge about values associated to territory and cultures established in them and present specific methods which will be summed to the methodological construction.

As it follows, such educational background process as any other gives the theoretical referential to, as consequence be practiced, exercised the apprenticeship which the subject studied is learnt and apprehended. To this fieldwork we could be inspired in the traditional formation of the craftsman which is done through the apprentice followed and ex-

perienced with the master (Rugiu, 1998). Thus, to indulge the presence of design students along with professionals in field, could facilitate the learning by practice, example and comprehension of the methods imprecision when used in association to the knowledge building. The student opportunity to live the experience caters security and confidence, both fundamental qualities to establish a comfortable relationship to the craftsman. This confidence could only be acquired with experience.

It is latent the recomposition need of design bonds with the territories and human processes which compose the artisanal process and mainly with respect to methods used as a way to preserve, deprive the access to the competences of design character.

> '…today, to maintain as productive differentiated schemes, the crafts organizations face a dilemma: it should keep the detachment which preserved themselves throughout the time and simultaneously they should be tuned to the information systems, associating to other economic bonds as tourism, culture, fashion, decoration and technology'. (Marinho, 2007)

The vocational training which operates in this scenario needs to go beyond the case studies that by now are experiences – favorable or not, they are already performed under methodological perspectives provided. The time is to think about antecedents, to focus on projects conceptual proposals. We need to overtake the phase of mere action implementations but to think strategically and in a broaden way about these actions. We need to discuss the referential, to reinforce the concepts, even we could not have absolute truth, but consensus which make sense in that territory and culture.

The design culture need to incorporate the research as a fundamental factor of project analysis, so the discussion about design projects of crafts go out of mere applicability or not a method and interact simultaneously with heritage, cultural, sustainability and innovation public policies.

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DESIGN AND CRAFTS. CONTRIBUTIONS TO IMPROVING THE DESIGN QUALITY OF HANDICRAFT PRODUCTS

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This paper treats an experiment conducted in the city of Maringá, PR ⁄ Brazil where an association of craftsmen showed high interest in developing products with recycled paper, but, demonstrated no experience in handling the material, which resulted in a low aesthetic quality and finished products. Hence, come to light a university proposal for intervention to assist this association, involving working with handmade paper. So design was used as a way to help artisans and this occurred through a course. For assisting the artisans a team was formed of two teachers and a student of the design course at the State University of Maringá in order to conduct a training course. In the course theoretical issues and practical techniques were discussed such as composition. At first there was resistance by some artisans in relation to the course content, but after the end of it and the practical results of their work in hand, they were surprised and pleased with the results.

••• Crafts, design, training, recycled paper •••

1. THEORETICAL REVIEW

1.1 Design e crafts

Braga (2002) states that everyone is completely surrounded by objects produced by the common people, utilitarian or decorative, such objects are the result of traditions and cultures, exploring materials and techniques and show various ingenious solutions.

Such objects, utilitarian or decorative crafts are considered, which defines Barroso Neto

(1999) as *"productive activity of objects and artifacts produced manually or with the use of traditional means or rudimentary, with skill, dexterity, technical accuracy, ingenuity and art. Crafts can be divided into several categories, according to the purpose it was intended, may be: utility, decorative, playful, expressive or religious".*

With the motivation and justification of the need to integrate the economic life of an activity that had long been marginalized in recent years began to appear increasingly interventions more frequent and systematic in craft production, promoted by various bodies of public and private sphere (Barroso Neto, 1999). In the 1990s the increasing rate of unemployment turned into a national priority any action that could represent increased opportunities for employment of labor and income generation. Thus, from this period, the craft becomes an option strategy to reduce social pressures caused by unemployment.

Within this context, Barroso Neto (1999) points off that for the best products reaching a competitive standard requires that in addition to rationalization, production optimization, cost reduction, quality improvement as well is necessary to incorporate these products offered something more, being unique , unique, with its own history, to speak directly to the hearts and minds of consumers. Thus one finds that the key to competitiveness is not the reduction of costs, but be adding value. And this is achieved in several ways, but the main one is through the use of design.

To better understand the issue, the research gathered the vision of Aloísio Magalhães, which according to De Paula (2008) was one of the pioneers of the craft as a reflection on national culture and the approach of this design, founding centers of cultural reference, investigated , and also documented and disseminated Brazilian popular culture.

Braga (2002) argues that Aloisio Magalhães was very dedicated to the preservation of cultural assets and the appreciation of folk art, had not absolutely anything against the industry but believed that the industry should not break with the popular knowledge, but that such knowledge should take its place. Already Dias Filho (2007) argues that Aloisio Magalhães attributed the craftsmanship to a technology that evolves over time, aiming to improve the quality of the object, as well as optimization of production, making the craft a moment in the history, not a static thing . Braga (2002) also argues that Aloisio Magalhães engaged by inserting the craft into a category that could be compared with art and design, thereby transforming the artisan in a designer in its purest form.

> "Actually I think that within the classical concept and Orthodox, there is no proper craft in Brazil. What seems there is a huge willingness to do so, for the creation of objects. It seems to me that the Brazilian case we could say that any activity with the characteristics of craft, I the other words, very direct relationship between idea and realization, little intermediation between the idea and the final object, are the earliest forms of activity that one wants to enter the course of time. Wants to evolve toward greater complexity and more effective results. (...) It is even possible to go further and say that this trend toward greater complexity, greater

development, characterized by a high rate of invention, as an attitude of pre-design. In other words, the craftsman is basically a Brazilian designer potential, much more than it is a crafts-man in the classic sense..." (MAGALHÃES, 1997)

Within this framework, Barroso Neto (1999) describes conflicts within the groups working with the craft due to different and opposing views on the renewal of product offering, aimed at increasing employment and income through the promotion of trade relations between the artisan and the market. Many believe that this should be a spontaneous process of creation of popular artists, while maintaining compatibility with the aesthetic and cultural repertoire from its social context.

In defense of non-intervention in the process of building design and craft production, it is the fear of the possibility of distortion products due to market pressures and thus causing the disappearance of types, patterns and other elements and cultural identification. Raising the question of how to intervene without spoiling, valuing and reinforcing these regional traditions, the ability of craftsmen, and the relationships within the groups. A serious action and consequently should know the difference between folk art and crafts in different segmentations of the existing, whose characteristics will guide the level and depth of interventions to decrease the possibility of distortion of the value of each of these products. Just as it is important to differentiate, and respect, the motivation of each of these agents, since the artisan seeks to produce an artifact, get some money to support himself and his family, the artist is motivated by the popular-creation "itself". So the craftsman is subject to market rules, obeying the law of supply and demand, rejecting that which does not meet consumer expectations. (Barroso Neto, 1999)

The design is not, nor can it be the exclusive privilege of the designers, should be understood as a holistic problem-solving with the main objective of their intervention to reconcile the interests and needs of those who produce to those who consume. The design always begins by identifying the problem, then seeking to identify the demands and offers, through the search for alternative solutions to consider all the factors involved and finally arrives in concrete and feasible proposals that promote economic growth with social welfare. (Barroso Neto, 1999)

According to France (2005) the challenge to designers is to identify the gap, create products able to find a local, national and international, for this is necessary to generate planning, decisions and practices that will directly or indirectly affect people's lives.

Braga (2002) states that the designer should not close into rules and closed programs, but must, keep your eyes wide open and extract of your environment new ideas and solutions.

In the relationship between design and craft Dias Filho (2007) reveals that this interaction will renew product offerings making them more distinctive and attractive to consumers.

As for intervention work with crafts Barroso Neto (1999) sets some limits that should not be extended, at the risk of making harmful intervention intended for another well-

intentioned it is. Each product belongs to a particular category, defined by its origin and nature, which will define the type of support needed. The products can be divided into five categories, such as a pyramid, which are described below:

• The first level, top of the pyramid corresponds to a small niche market, high purchasing power, and offer unique products, unique pieces and limited production. Works of folk artists, craftsmen, whose main motivation for the work is personal satisfaction. At this level the lower the better external interference, the less influence an artist receiving the most unique and original is his work. The only intervention at this level should be to promote, reward and highlight, that is, to appreciate these works.

• At the second level of the pyramid would be traditional products, indigenous, strong ethnic content, is also called "craft of cultural reference." In general they are parts that require great skill and dexterity and, in general, produced in small scale. They are repositories of a cultural tradition, passed from father to son, from master to apprentice. Reveal part of the history and trajectory of the social group that produces them. In this group the most desired intervention is one that adds value without changing the essence of the original products, packaging may be through an appropriate value products, seals of origin, labels or tags that contextualize the product. The interventions made directly to certain products to meet specific market demands can be made, but respecting the characteristics of the production process and preserving the main elements of cultural reference, anyway, this rebuilding process must be done in conjunction with the craftsman and not imposed from above. The changes usually are gradual and occur in only a small share of output. For a measure of caution the renewal of a commercial product portfolio shall not exceed 20% of the cast parts produced.

• The third level is the contemporary crafts, urban, produced by individuals with a repertoire broader cultural and technological, also known as "craft creation." Its commercial value is largely determined by the balance between expressive value (regarding aesthetic and cultural) value in use. At this level interventions may be total and radical, ranging from the replacement of the raw material, through the rationalization of production, design of new products, business strategy, even to the management of the business, because at this level, in general, the craftsman is mostly an aspiring entrepreneur. His primary motivation is economic gain, the need for survival.

• In the fourth level are the typical products of a particular region, such as sweets, jams, jellies, wines, liqueurs, brandy, dried fruits or processed, dried flowers, essences, etc.. These products are of great importance, because together with traditional crafts can make a "mix" of products, supporting each other. For these typical products of the best intervention is to propose systems to promote and add value, involving the packaging, labels, advertising campaigns, sales booths, and all sorts of promotional material. Another important support in this segment is related to optimization and modernization of production processes, incorporating new technologies, reducing the processing steps, reducing time

and improving quality.

• In the last level is the craft of large-scale production, the industry of "souvenir" and memory, also called "stereotypical craft." In general they are banal products, low cost and high volumes, which vulgarize typical elements of local culture. Due to their characteristics these products can be produced regardless of their place of origin, this case does not bring any benefit to the region. Many call this production "industrianato" . The benefit can be extracted from this kind of "craft" when produced in the region, is the possibility of using a significant amount of labor with low education and who finds this type of production an opportunity to work. At this level the main support that can be offered and with the introduction of modern methods and techniques and more efficient business management, the proposition of products with a design most suited to your consumer.

Barroso Neto (1999) explains on that this classification, when we ascend towards the apex of the pyramid, is the largest value of cultural products and lower is the use of elements of mechanization of production and less should be the intervention design. Not that these are strict limits on the role of designer, but tries to propose ethical parameters to be considered in intervention with the craft.

2. DESIGN E ARTESANATO EM MARINGÁ

The experience of Maringa, which will be reported in this study, started in a contact between the Product Design course (LDM - Laboratory Design and Fashion - EMU), and PRO-RESÍDUOS UNITRABALHO.

The PRO RESIDUOS Waste Management Program of State University of Maringá, and one of the goals of the program is to encourage, coordinate and systematize the activities related to waste management. The UNITRABALHO is an Inter-University Foundation for Studies and Research on Work, in order to contribute to the social debt that Brazilian universities have with the workers, carrying out partnership projects of studies, research and training. In the end the LDM is the Laboratory of Design and Fashion that provides services in the area of Design for the State University of Maringá.

The union between these three groups allowed contact between the LDM and the San Antonio Craftsmen Association (AASA). According to its president, Marie Sakamoto Nishio, the Association has 26 craftsmen (FIBRASOL, 2011), composed of diverse people such as homemakers, retirees, teachers, artists, students, professionals, health workers of the Family Health Program, security agents, needed of some therapies and lovers of beauty and art.

This Association was already producing various products and marketing them. However in early 2011 was presented through the UNITRABALHO, the recycled paper produced by the training of the Coopercentral by the PRO RESIDUOS. The Coopercentral is a cooperative of collectors who were trained to produce and market the recycled paper, suitable for the same production of AASA products.

AASA's products had a peculiar characteristic. First, the Association has not a specific focus, therefore, each artisan has a type of product without worrying about the group, in a second phase with the input of recycled paper, the AASA has received an order for goods to giftware events. The issue was that the products developed did not have sufficient quality to be used. Checking the classification Barroso Neto (1999), products made by members of AASA could well grounded, would be on the fourth level of the pyramid, typical products of a given region.

Recycled paper has brought new market opportunities, but the members of the Association had no mastery of techniques that resulted in well-finished products for sale. It is possible to check in Figure 1, in the work performed prior to the refresher course.

FIG. 1: WORK CARRIED OUT BY MEMBERS OF AASA.
FONT: FIBRASOL (2011)

The excess materials and the lack of criteria for use of colors and materials resulted in products with little aesthetic quality, visual and functional. The materials were used without being considered physical characteristics such as weight, differences in raw materials, etc.

Checking the products made by artisans a proposal was made by LDM for a refresher course. Then UNITRABALHO gave the money for the purchase of materials, adequate room and enabled people to assist the activities on the other hand, the LDM prepared the theoretical and practical activities and capacited people for the classes.

The course was divided into two stages, where at first 14 hours were directed to activities to develop creativity and development of new products with recycled paper. In a second step

eight hours were directed to various types of binding.

At the beginning of the course, there was a lack of identity in the works, and knowing the need for compatibility with the aesthetic and cultural repertoire of the social context, as suggested by Barroso Neto (1999), was decided to work together to identify the identity of the local. Next to the proposed theme was suggested as motto a phrase: That all I do bring the peace and well. This phrase was repeated several times in order to draw attention to the significance of each of its products and also remind them that each one can impregnate your product in a single message, or may be singular, as pointed out by Barroso Neto (1999).

The methodology followed a series of explanations and oral activities followed by activities for implementing content. The content and activities applied will be detailed below.

2.1 First stage:

This first stage was carried out in two days, 14 hours of activities in a large room class with big tables, where participants performed the tasks without difficulty.

SUBJECT 01 – WHO I AM?

It was first proposed a dynamic self-knowledge and knowledge of classmates. It was suggested, initially, a dual activity, with questions for personal awareness and greater interaction among participants.

The intention was to strengthen the ties of the members, but also to make each one to think about its characteristics. For this, a member of the pair should question the other on general data such as name, place of birth, number of family members, activities that give you pleasure, qualities and defects.

In a second stage, each member of the pair should present his colleague to the entire class with data from the private conversation of the pair. It was remarkable how everyone became interested in the history of the partner and helped to raise their qualities.

After this activity created a more intimate atmosphere among the participants, especially when they talked about the family and the difficulty of each report their qualities.

SUBJECT 02 – COMPOSITION

The composition process is the most crucial step in solving visual problems. The results of compositional decisions determine the purpose and meaning of the visual manifestation (...) says Dondis (2003). The intention of the SUBJECT 02 with its activities was to clarify that the whole composition has a message, and the intention is to compose something to say (message) to someone (receiver).

Was approached the subject with practical examples, along with the formal concepts of each element worked. Thus, some images were presented and participants were asked about the message conveyed those compositions, as in the following examples (Figure 2):

FIG. 2: AMBIENT 01   AMBIENT 02
FONT: PREMIO TOP DE ARQUITETURA (2011)
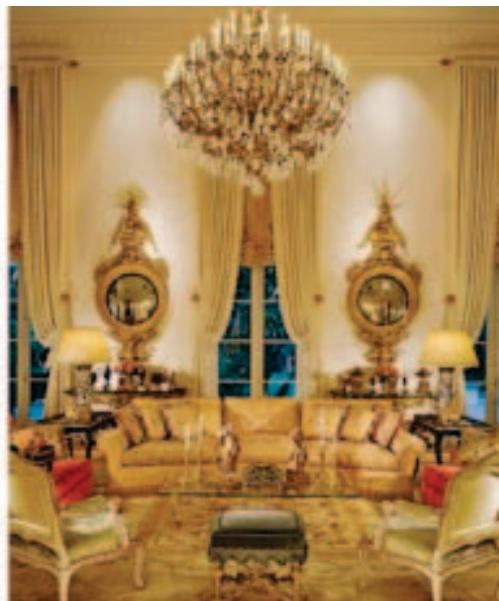
Participants were able to describe, in each case, people who lived in the exposed ambient, your lifestyle and what each composition could say to the observer, in this case, the receiver of the message.

Similarly, in an example of differences in clothing, was a clear difference between people presented their lifestyle and behavior in various situations, the message was clear about what the sender wanted to convey to the receiver.

After various examples, it was known that any object, picture, environment, clothing, etc., can transmit a message. So was brought a Brazilian popular myth which claims that "when the baker is in a bad mood the cake and the bread does not grow." All who were there said it was really true to say popular. It was a way to establish the relationship between the artisan and their artifact, and to establish that there is a link in this direction, which can take the mood or the message that the craftsman deems necessary.

At this time the group was presented the idea that the products they produced also said something. Was asked whether they had the idea of what they meant with the products. Knowing that the question of identity was unknown about the products was proposed the sentence: That all I do bring peace and well, was repeated a few times so there would be fixing the understanding that the products had the power to transmit a message.

SUBJECT 03: WHAT I SEE? WHAT THEM SEES?
At this stage was handled about differences characteristics of the receiver and transmitter.

Differences between culture, religion, race, age, gender, profession.
The example used for the issue of difference between cultures was the ideogram:
At first step was asked to the participants which meant the picture: the majority answered that for they were only traces. He introduced himself then the meaning, for someone of Japanese culture: friendship.

友情

After this step beginning the question about what could help convey a message clearly.
Right now there was a deadlock, because when it comes to local identity, the consolidation of the characteristics of a people facilitates the identification of local identity. But the city of Maringa, located in the northwestern state of Paraná is extremely young, with only 60 years, settled by people of different nationalities and regions of Brazil. Unlike other historic Brazilian cities as Salvador (Bahia) and Rio de Janeiro (Rio de Janeiro), in Maringá the mixture of cultures is still creating a local characteristic.
In this time of the course the question arose on the local identity and the need to discover the identity of Maringá. Again, through images, examples were given of how a people can strengthen their identity through cultural, local customs, geographical features, architectural elements, etc..
After this step, was studied the elements of composition.

SUBJECT 04: ELEMENTS OF COMPOSITION.
The point: as an attractive and least attention;
The line with its movement and direction;
The form;
The figurative and abstract composition;
The balance and tension;
The leveling and the sharpening.
After the presentation of these elements, was presented images and it were done discussions about its characteristics. If it was figurative or abstract, tense or balanced, capped or sharp.

PRACTICE ACTIVITY 01:
Equipped with various materials for collage and drawing, participants were divided into teams of three people and how was proposed to create a composition of glue or collage / drawing to convey a message and using elements of composition that had been learned

so far . During the practical activities the participants were asked in relation to finishing techniques in order to assimilated by the work the technical issues using various materials.

SUBJECT 05:
Symmetry and Asymmetry;
Positive and negative (Figure and Fund)

PRACTICE ACTIVITY 02:
Was proposed a practical activity where participants had free theme, but they needed to clarify the message that wanted to transmit and the compositional elements employed. Generally, in all activities, the groups drove their compositions for any product that could be made by them. The activity was done while playing "Tocando em Frente", composed by Almir Sater and Renato Teixeira.

SUBJECT 06:
Psychodynamics of colors;
Primary colors;
Secondary colors;
Complementary colors;
Chromatic circle.

PRACTICE ACTIVITY 03:
It was proposed that each participant do a chromatic circle with gouache with primary and secondary colors, the result would be used in other activities, so that each participant could identify as the color was applied and what results it might bring to the receiver.

PRACTICE ACTIVITY 04:
Combination of colors. With material directed to this activity (colored squares of paper) was proposed to carry out color combinations in pairs. At the time of exposure of each pair, the participants could suggest changes to display a new proposal or report what they could understand the proposal made by the colleague.
This activity aimed to support the choice of colors of the work to be undertaken and provide recognition of how the study of color combination could result in more accurate work in relation to the intention of the sender (craftsman).
The activity began with the presentation of a model with several squares of paper of different colors, which could be grouped and regrouped. As in Figure 3.
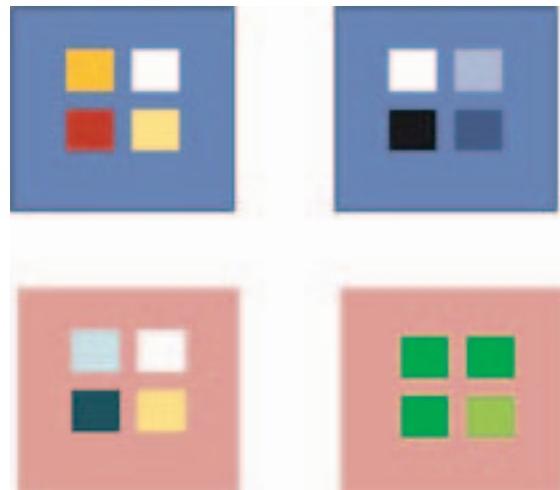
FIG. 3: EXAMPLES OF POSSIBLE COMPOSITIONS WITH MATERIAL AVAILABLE IN SEVERAL COLORS.

PRACTICE ACTIVITY 05:

In this activity, participants were divided into four groups to perform a card with an image as reference (Figure 4). Since the chosen images could be found in the city of Maringá. The proposal was that the composition elements were used for the development of a card to be sold.

FIG. 4: IMAGES USED AS A REFERENCE FOR WORK

The first step would be to identify the colors that were in the image of each group and how these colors are related. However, the main difficulty was in not making use of the figurative image, because the copy of the reference was more practical. The development of alternatives that were not identical copies of the images presented as a reference was then the main challenge.

At this time there were some dead ends, as some participants that wanted the course being focused only on the technical and presentation of copies of models that could reproduce themselves without change. The need to create an alternative by the participants generated some discomfort in some people. However, not all had this vision, many were keen to develop alternatives.

The first day's activities ended with the presentation of the work done by the teams. During the presentations the teams commented on the colors and composition techniques employed, and especially the message that they wanted to convey.

On the second day of activities, focus was given to the activities leading to the generation of new products. It was considered that AASA offers products for meetings and events, and provide them to generate new products would be of paramount importance to its activities.

SUBJECT 07:

On the new product offered by the group would take steps for the team:

⁄ Discussion on topic, respect of the subject with something existing in nature, regarding the subject with a solution that already exists, 3R (reduce, reuse and recycle);

⁄ Identification of elements of composition, geometric elements of nature, composition with repetition, gradation size of elements of the composition;

At this time the discussion took place regarding the development of a penholder for speakers of an alleged event. All participants gave opinions, while this was ministering to record ideas on a board and was urging the participants to discuss using the techniques of creativity as a base.

After this step the collective, was given a practical example of a composition having an element of nature, and this was used an image of a type of plant that was near the site of course (Figura 5).
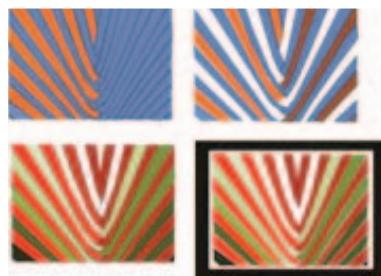

FIG. 5: EXAMPLES OF DIFFERENT COLOR COMPOSITIONS USING ELEMENTS OF NATURE

Together these examples were reinforced some finishing techniques, such as borders, margins, cut to fit, frames, paspatur, weight, creases and folds.

PRACTICE ACTIVITY 06:
Pairs were formed, which had the task of developing objects to events and sale . It was also known that the products should be used in various places, which were suggested by the lecturer, in order that the AASA may receive orders for various types of objects.
Thus each pair launched its product, which were frame for a girl picture, congress folder, gift bag and note blocks (Figure 6).

FIG. 6: PRODUCTS RESULTING FROM THE PRACTICAL ACTIVITY 06

During the execution of the activities were reminded of the concepts discussed in the previous steps and during the presentation of each product requested to be reported as they were applied to the concepts covered during the course.
After this step, has begun the final work, which was a more complex work, done in pairs.

PRACTICE ACTIVITY 07:
The object proposed was a luminary, which could be performed on various materials, however, the recycled paper should necessarily be used.
Each team developed a proposal, and the concepts studied in the previous stages of the course were observed. The activity of the luminary was intended to take into account the technical operation of the lamps, which greatly contributed to the personal development in relation to solving new problems (Figure 7), considering that before the course the artisans used to copy models.
The first step of course was closed and the last activity on the team HAD generated a sense

of competence. When each of the lamps was lit, all participants were tremendously pleased by the result.

FIG. 7: PRODUCTS RESULTING FROM THE PRACTICAL ACTIVITY 07

At the end of this first stage the participants were able to achieve improvements in technical and visual quality of its products without following templates, this would be the greatest achievement of the group.
After 30 days was held on the second stage of the course, which was attended by a student of the course Design of EMU Campus Cianorte.

2.2 SECOND STAGE:

In the second stage the focus was directly in the techniques of binding. Was illustrated various binding techniques. Then, each pair developed a product and applying the proposed technique. Because some types of bookbinding manual, it was necessary to use fabric in the manufacture of some products, but the handmade paper always was in the composition.

FIG. 8: WORK RESULTING FROM THE SECOND STAGE OF THE COURSE: MANUAL BINDING

CONCLUSION

At the beginning of the work there was some resistance from some participants, which was due to ready habit to repeat models. That because this technique is widely used from long time only repeat , the same way as was done with the handmade binding technical. This way of working, to conditioned the craftsman to the repetition of a particular model. The intention of the course was not only teach techniques that could be repeated uncriti‑ cally, but first give some basic composition to the participants so that they could produce their own products properly in relation to the techniques of composition and construction. Was done during the course to ensure features of the work of the craftsman, so that, through the newly learned concepts, it could make his compositions, without the intervention of ministers, so that instructions were carried out for problems with techniques.

After completion of the work may be noted the gain in quality of products produced by members of AASA. The products are finished and proper use of materials, the members themselves reported at the end of the course they were surprised with the results obtained in such a short time.

Although there is not a permanent agreement between the LDM and UNITRABAL‑ HO, with the positive results of the first refresh course, there is an indicated to the continu‑ ity of training courses for this type of clientele.

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EDUCATION AND COMPANIES TOGETHER FOR THE ENVIRONMENT. EDUCATIONAL EXPERIENCES FOR DEVELOPING THE CULTURE OF WASTE SEPARATION AND RECYCLING OF PAPER MATERIALS

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By focusing upon two educational experiences undertaken as part of the Graphic & Virtual Design Degree Course at the Politecnico di Torino with local companies, we intend to highlight how the value of the relationship between companies and educational activities, in the design discipline, lies primarily in the development of products and services with a highly cultural connotation. This is thanks to a university methodology which, focusing particularly upon interpretation of the social and cultural context, as well as technical aspects and aspects relating to the market itself (definition of scenarios), is able to outline behaviours, solutions and principles in line with conscious and modern design, where innovation strongly correlates with the development of cultural aspects even more than technological ones.

In particular, the educational activity was conducted with Amiat, Multiservice Company for Environmental Hygiene in Turin, and Comieco, National Consortium for the Recovery and Recycling of Cellulose-based Packaging.

••• Recycling, waste separation, packaging, merchandizing •••

The encounter between two cultures, the operational one of production (of services or products) on one side and the speculative culture of training on the other, is traditionally an opportunity not just for a fruitful and reciprocal exchange of knowledge, but also a time for research where individual attitudes change and evolve in the mutual dialogue. The interest in these experiences, from the perspective of design disciplines, lies also in the aspiration to put together real/achievable proposals, where the cultural approach is at the forefront and is clearly recognizable. The objective is to define products or services, where the "educational" nature (from the point of view of good practices in relation to ethics, society, the environment and consumption, etc.) towards the user/consumer is not secondary to their functional nature.

But what is the specific contribution of the educational activity, in relation to commercial dynamics and to development of the company?

If we consider a basic outline according to which the company develops services and products, with contributions from professional consultants or research bodies, and releases them onto a generally localised market by way of commercial communication systems (industry trade fairs, advertising campaigns, BTL communication), we can see how this outline changes when the relationship with education is added.

From the point of view of the process, education stands out as a tool for addressing specific themes in accordance with a university methodology which sees at its forefront an in-depth activity of acquiring the relevant knowledge and processing it through a multi-disciplinary approach. The analysis phase (meta-project) is the founding moment of the process of developing the proposal, as well as being preparatory to it and, in terms of educational value, it is also more important than the next phase of project development. From these analyses it is possible to focus upon the intervention scenarios and finally to give rise to real application models (product or service projects).

Generally, the relationship between education and business, for developing a specific theme agreed between the parties, on one side leads to a transfer of know-how from the company on that educational activity (which actually completely replaces the "external consultancy" and research system, conducted, in addition to the students themselves, by the lecturer and teaching consultant) and on the other leads to a system of OUTPUT on the education side which is not simply limited to developing the project, but also involves the construction of Scenarios of analysis and investigation. In this approach, we no longer consider the market as the only recipient of the project activity, but in a broader sense "society" is also considered as the beneficiary of the action. This is precisely by virtue of that analysis which tends to involve social and cultural aspects, as well as considerations in terms of performances. As a result of this extension of the recipient, the communication system is also altered, adding the "cultural" approach to the purely "commercial" one. This communication is based, as well as on traditional commercial channels, also upon developing exhibitions, publications, taking part in conventions and seminars, aimed also at a wider audience.

If, then, the companies involved are bodies operating in the social/cultural sector, whose objective is not so much the manufacture and sale of consumer goods, but the provision/promotion of services for social welfare (cultural organisations, social co-operatives, safeguarding institutions, etc.), it can be said that the communication, as well as being instrumental, becomes a true output of the educational activities, on a par with the project results. In this scenario, the recipient expands further, including not only the market and the company, but those institutions and government bodies.

From these considerations, we intend to report upon the dual experience, carried out in the form of educational conventions, conducted by the design courses Design per la Comu-
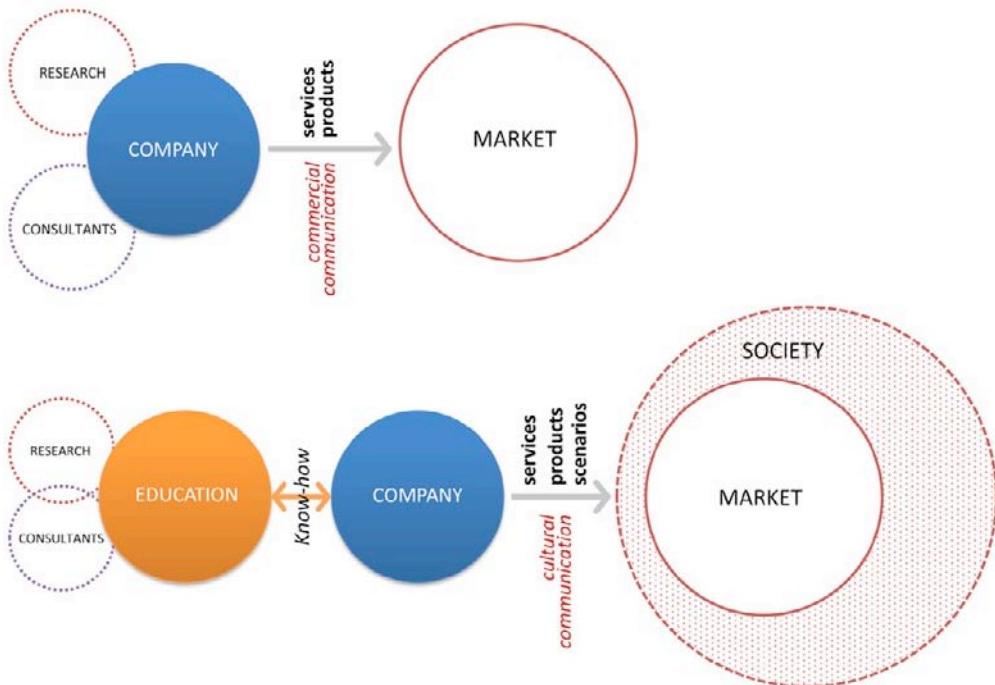
FIG. 1. COMPARISON OUTLINE OF THE BUSINESS-MARKET (A) AND EDUCATION-BUSINESS-MARKET (B) RELATIONSHIP.

nicazione Visiva (Design for Visual Communication) and Cartotecnica e Imballaggio (Paper Products and Packaging) of the Graphic and Virtual Design Degree Course at the Politecnico di Torino, in conjunction with some local operators, on the theme of waste management, with the aim of promoting the culture of waste separation and packaging recycling.

The organisations involved were, on one side, Amiat, Azienda Multiservizi Igiene Ambientale Torino (Multiservice Company for Environmental Hygiene in Turin), on the theme of waste separation, on the other, Comieco, Consorzio Nazionale Recupero e Riciclo degli Imballaggi a base Cellulosica (National Consortium for the Recovery and Recycling of Cellulose-based Packaging), together with Slow Food, as regards paper packaging for typical food and wine products.

AMIAT EXPERIENCE

The first experience began during the academic year 2008-09, between the Graphic and Virtual Design Degree Course at the Politecnico di Torino and Amiat, Azienda Multiservizi Igiene Ambientale Torino (Multiservice Company for Environmental Hygiene in Turin), conducted as part of the Design for Visual Communication 2 course by Professors Marco Bozzola and Riccardo Pietrantonio under the scientific responsibility of Paolo

Tamborrini (Politecnico di Torino).

Amiat is a municipal company which deals with environmental hygiene services for the City of Turin; in particular, it manages and supplies integrated soil hygiene (cleaning streets, shovelling snow, collecting leaves, cleaning markets, clearing riverbanks) and waste collection services, as well as managing some treatment plants for their disposal and recovery.

The Brief

Upon the 40th year of activity for the company, the hundred or more students enrolled on the course were asked to design the logo for the anniversary celebration and to come up with a merchandising product, designed "ad hoc", which would strongly represent the company identity, its values and objectives. The merchandising was to be aimed at the "internal" user (Amiat employees), or the "external" user (suppliers, customer, general public) and a fundamental requirement of the design would be its environmental sustainability content, as well as the economic element, both from a physical perspective and that of product communication.

Scenario

The initial meta-project activity conducted, which occupied the students for approximately the first half of the course, involved analysing and constructing a Scenario that was able to cover, critically, the set of characteristics in the project's area of interest. Starting with the information and specifications contained in the brief, an "ambient interpretation" was conducted which touched upon many aspects, including the most significant:

- Characteristics of the company

Research in which the characteristics that represent the company were highlighted and summarily described (relating to caring for the territory, the international dimension, the nature of public service), the activities undertaken and services provided (urban hygiene, waste disposal, energy recovery), image and communication characteristics (relationship with citizens, caring for the environment, future projection), etc.

- Target audience:

Clarification was made of the characteristics of the various recipients of the merchandising product, so as to be able to assess its type, language, "dimension". In particular, a varied target audience was identified, ranging from local administrations and institutions, to company suppliers, employees and citizens of Turin.

- Merchandising

Investigation into the features of the merchandising product; types (generic customisable, ad hoc, territorial); variations in meaning between merchandising gadgets; the function of use and that of communication; products for sale and products for gifts, etc.

- The anniversary concept

Investigation into the meanings, values and suggestions that the anniversary concept brings with it. At this point of the research, the focus turned to some key concepts that might be contained, in various guises, in the product: concepts such as celebration, identity, history, joy, festivities and sharing.

- State of the art and the market

Reconnaissance of some analogous companies of Amiat, in Piedmont, nationally and internationally. Useful research to understand the attitudes already in place with respect to image and communication strategies, existing merchandise, market positioning.

These areas, together, therefore represent the context in terms of production, consumption, culture and society which surrounds the operation in question and they highlight the overall system of constraints (current user requirements, production process, distribution process, costs) and opportunities (unexplored behaviours, new targets, cultural stimuli), as well as providing useful and fundamental information and input for the project being developed.

The Scenario analysis undertaken by each working group and discussed repeatedly with the teaching staff, resulted in the production of summary graphic panels, which were then evaluated didactically, and subsequently brought together into a single document which
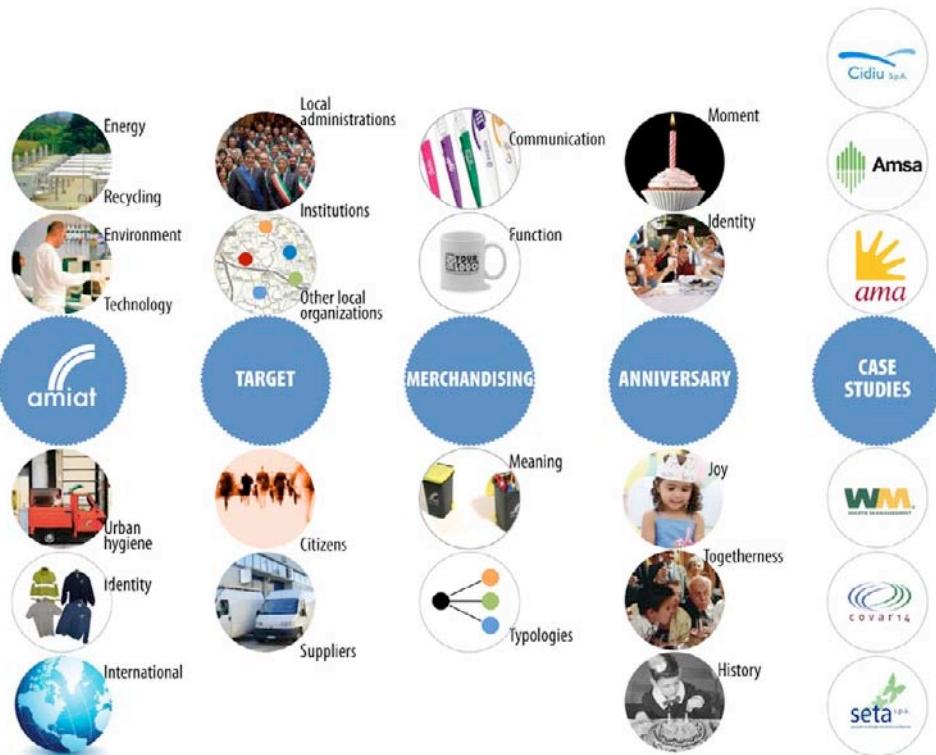

FIG. 2. AMIAT SCENARIO: SYNTHESIS OF AREAS IDENTIFIED.

was made available to the entire class as a tool for developing the subsequent phase of the project. This documentation, the sum of the critical mass on the theme in question, also represents the first output of the research relating to Amiat.

The Proposals

Based upon the feedback from the Scenario analysis, the merchandising proposals developed by the students for Amiat were all dedicated to environmental, social and economic sustainability: minimal and useful products able to denote values and suggest appropriate behaviours in relation to the production and management of waste.

In general, the results can be grouped into some macro-categories, according to the approach adopted and the values to be communicated:

- WASTE MANAGEMENT

Products with the function of facilitating waste disposal, whether it be household waste, office waste, small consumer products such as cigarettes or chewing gum (e.g. books of papers for wrapping up and throwing away chewing gym, systems for reducing the bulk of plastic bottles or cans when throwing them away, paper waste baskets to be applied to the legs of desks, etc.)

- CLEANING

Products for household cleaning, for cleaning personal accessories and decorations in general (uniquely shaped small brushes and dustpans exhibiting the Amiat logo, pencils equipped with a cap/brush to collect the remnants of erasing, perfumed containers for the car, etc.)

- "SYMBOLIC" PRODUCTS

Products not strictly connected to the activity of cleaning or waste management that is characteristic of Amiat. Objects, then, that are less "explicit" but which play upon an allusive dimension and semantic association: one of these, the seasonal fruits with "Amiat" sticker, highlights the fact that being attentive to the cycle of the seasons, and therefore the rhythms of nature, correlates with a healthy lifestyle which is respectful of the environment.

- RESPECT FOR THE ENVIRONMENT

A thematic variation on the "symbolic" category. In this case, too, the proposals coincide with products/metaphors, in that the reference to nature and to "cultivation" in particular attempts to be a sign of caring for the environment. The message is simple and clear: Amiat helps you to create and defend nature through the use of specific products.

FIG. 3. RECICLES.
BOOK OF PAPERS FOR WRAPPING UP AND THROWING AWAY CHEWING GUM.
THE PROPOSAL AIMS AT EDUCATING, IN A FUN WAY, ABOUT THE APPROPRIATE WAY TO DISPOSE OF THE PRODUCT.
DESIGN: I. BOSSO, A. CASCARANO, S. PELLERINO.
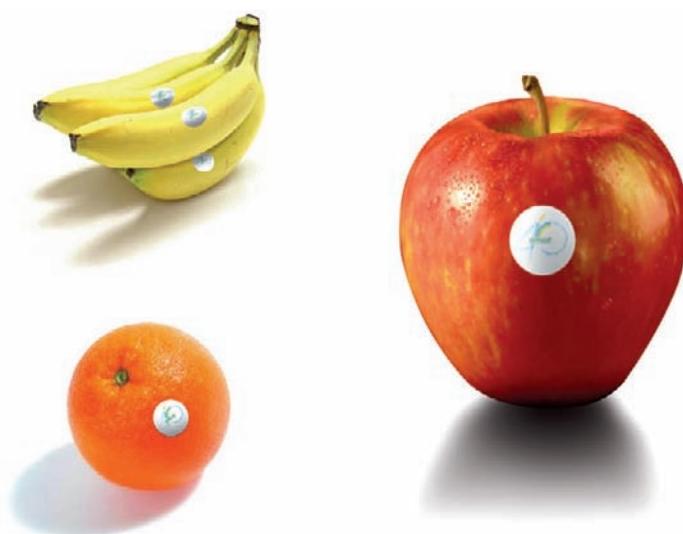
FIG. 4. SEASONABLE.
"SYMBOLIC" MERCHANDISING DEFINED BY SEASONAL FRUITS WITH THE COMPANY LOGO APPLIED IN THE FORM
OF A STICKER. DESIGN: F. EMERY, Y. SANTINI.

COMIECO EXPERIENCE

For the purposes of continuity with the activity conducted, the educational collaboration was formalised in next academic year (2009-10) between the Graphic and Virtual Design Degree Course at the Politecnico di Torino and Comieco, Consorzio Nazionale Recupero e Riciclo degli Imballaggi a base Cellulosica (National Consortium for the Recovery and Recycling of Cellulose-based Packaging), together with Slow Food. The operation was conducted as part of the Cartotecnica e Imballaggio (Paper Products and Packaging) course run by Prof Marco Bozzola, under the scientific responsibility of Prof Luigi Bistagnino (Politecnico di Torino).

Comieco is the National Consortium for the Recovery and Recycling of Cellulose-based Packaging and it deals with promoting the activity of recycling paper materials and raising awareness about the value of waste separation, also through activities involving citizens, companies in the paper packaging sector, institutions and universities. It also has the institutional task of achieving the recycling targets set by EU regulations and adopted by national legislation.

The Brief

The aim of the course was to develop sustainable proposals for systems of transportation, sale and consumption of food and wine products, from paper materials. This would include containers to be used for temporary purposes, situations of daily "nomadism", independently outside the home, and in particular, at Turin's Salone Internazionale del Gusto (International Food Fair).

In this context, some specific areas in which to position the proposals were identified, in particular:

- *Places already equipped for food consumption.*

Restaurants, bars, sandwich shops at the fair which may require systems for setting the table quickly (place mats, coasters, trays) as well as gathering and delivering the food to the customer to take-away, whether it be a takeaway service or collecting the leftovers of the meal.

- *Producers' stands*

Visits to the individual producers, where exploration of the typical food offer is achieved by tasting the products on show. Small samples, also of different foodstuffs within a short period of time and space, which generally require small accessories and mostly disposable supports.

- *"Picnics" at the Fair*

Meal consumption in improvised places; sitting on the floor, on a bench or leaning against random supports. Snacks that can be consumed inside the fair or in the adjacent outdoor spaces. Break times that are taken "freely" and independently, where meals are generally consumed in portable or hermetic containers, of which the mess tin is the archetype. These can occur alone or can be a time of aggregation whose social and recreational function is

complementary to the function of nourishment.

The projects would focus upon single-use paper systems (disposable) or reusable solutions in different contexts other than the purchase (e.g. picnics, lunch break at work, etc.). Based upon the identified scenario of use, provision was made for single or multi-portion containers, systems for eating whilst seated or standing and portable multi-tasting accessories, etc.

In some cases (e.g. producers' stands) it would be useful to hypothesize some specific relevant food products.

In particular, the students were asked to reflect upon the concept of eating in dynamic conditions, in a temporary context, according to requirements strictly connected with the act of moving around and the lack of fixed supports.

The research for functional and innovative solutions, in relation to the identified area, was to be undertaken with a view to systematising the characteristics of ergonomics, safety, protection, lightness, autonomy and environmental sustainability.

In developing the concept and the product characteristics, a fundamental requirement was the use of paper material and development of the activities of recycling and recovering the container at the time of its disposal.

Scenario

Also in this case, the path of developing the proposals commenced with the construction of a relevant Scenario, with investigation and analysis into the areas surrounding the identified theme. In particular, the products developed by the students were concentrated on:

- RELEVANT VALUES

Analyses of the characteristics of Comieco, from the profile of values expressed and activity undertaken: attention to the environment and recycling activities, management of packaging, use of paper materials, the institutional role. The framework of values was also completed by examining the other two entities involved in various guises in the operation: Slow Food and the Salone Internazionale del Gusto event, involving the concepts of quality of life, respect for biodiversity, social equality, local agricultural production, material culture, territorial value and nutritional education.

- THE TARGET

Investigation into the relevant user and their prerogatives. The analysis led to the definition of four types of main user: the sector operator (who exhibits at the fair), the connoisseur (demanding in product tasting, also moves independently), the enthusiast (interested in the theme; for him/her, the visit and tasting are a source of entertainment and pleasure) and the curious (to discover a field he/she does not know well).

- CONSUMPTION SCENARIOS

Discussion of the features, already partly contained in the brief, of the specific environments in which the project is positioned (equipped locations, producers' stands, picnics at

the fair). The dynamics of meal consumption in these contexts was analyzed: the need to operate while standing rather than seated, to use, or not to use, instruments and accessories (use of utensils or hands directly), the opportunities for sharing the meal, the encumbrance of any accessory elements carried whilst moving around (bags, brochures, purchases), etc.

- PAPER MATERIALS

Exploration in respect of the technologies of transforming and processing paper. From the production of virgin paper to recovery and recycling systems. Investigation of cellulose-based semi-finished products present on the market (sheets, pressed cardboard, corrugated cardboard, honeycomb cardboard, tubes) and their performance characteristics, types of processing and use. In particular, a visit taken by the class to a paper company in the Piedmont area was extremely useful for the development of this phase.

- STATE OF THE MARKET

Investigations on existing products for transportation and/or consumption of meals independently or outside the home: critical interpretation of solutions already present on the market (starting from those created in paper materials, but not limited to such) allowed for greater understanding of the system of requirements and the performance of those products, as well as increasing awareness of the constraints and opportunities.

- PACKAGING REQUIREMENTS

Research focusing upon the main requirements for systems of packaging and consumption of meals: the critical mass of the characteristics highlighted by the students was made possible by the previous analysis with respect to existing products, as well as the thematic bibliography.

In particular, the recurring and in-depth requirements relating to the functions of containing (dimensional consistency, resealing, capacity); protecting the contents (through fastening systems, joints, creation of non-slip surfaces, watertight sealing); transporting (presence of handles, content fastening systems, pocket-size products, lightness); managing spaces (products that can be re-sealed, rolled-up, folded, disassembled, able to reduce their bulk when not in use); organising the contents (containers with internal sections, functional pockets, spaces for accessories or waste from the meal, etc.); consuming (with utensils, with the hand, with ad hoc implements, solutions which guarantee freedom of movement, manageability, self-preparation or which allow the food to be cooked or reheated); evoking (formal references to archetypal elements of the outdoor meal, to food processing products, to the territory); fun-interactive (any additional function for an engrossing experience also through interactive and multi-sensory stimuli); communicating (identify the function, declare the contents, provide information, graphical solutions).

FIG. 5. COMIECO SCENARIO: SYNTHESIS OF AREAS IDENTIFIED.

The proposals

The Scenario research shared by the various project groups gave rise to proposals charac-terised by a common approach, aimed at satisfying the functional requirements of packag-ing, but above all focused upon easing their use, playing, from time to time, on sensorial, fun and evocative qualities. They can be considered products with an educational nature to the extent that they are intended to go beyond the function of mere protection for the sale, suggesting new approaches to the product and communicating the culture of waste management beyond the values which make the typical foodstuff a cultural resource ahead of a market product.

As well as the environmental aspect, linked to facilitating packaging disposal, there is also a cross-reference to the founding values of the Slow Food approach - good, clean and fair – which, from the food product, are referred here back to the container itself, extend-ing the meaning according to which the function of enhancing the identity of the product, environmentally-friendly packaging, respect and integration with the natural-territorial system is a central issue.

Through this approach, it was made possible to appreciate and enjoy the food products at best: a natural food product is enjoyed on a support that respects the environment and traditions, relating to typological archetypes that form part of our historical memory, as well as our material culture.

Supports which inform us of the taste of the food, but which we also know are made completely from paper, and both, knowing and tasting, define a cultural product, with its history, the social relationships it has established, the territory which generated it, but above all which identify new methods of consumption.

These are the themes that have stimulated the thought and creativity of the students who directly transferred their ideas onto the study models and prototypes through direct and continuous contact with paper. It was a design process that led to very concrete and immediately realisable proposals; the result of a careful study of the already existing systems which, in some cases, have become pretexts for improvement, in others, inspiration for innovative solutions.

In particular, the 25 proposals created, strictly from paper, are ascribable to some recurrent areas of meaning:

- INNOVATIVE USE

Supports which, as well as meeting basic functional requirements, present innovative solutions in the use of the food product (packaging "you can wear" so that your hands are always free, supports for glasses fitted with "anti-drip" flaps to avoid stains, etc.)

- MULTI-FUNCTION

Systems which integrate several functions within the same product. Bags for carrying food, but which are also designed to hold, in a special separate pocket, informative material from the Salone del Gusto (International Food Fair), glasses that are able to involve, in alternative ways, taste and smell, packaging that can be made up in a single configuration for show purposes, ...

- EDUCATIONAL

Products which, beyond their specific function, are intended to suggest best practices in the approach to food consumption, as well as sustainable behaviours in waste management (containers for sharing meals, kits for children which tell the story of the origins of food, containers for wine that can be used in small doses to underline the value of the product, to be tasted rather than consumed).

- "SYMBOLIC" PRODUCTS

Products with a highly evocative nature, characterised by formal solutions or methods of use which refer back strongly to some of the founding values of the relevant Scenario (trays created with layers of cardboard sheets to represent the morphology of the territory, a support for the hand which, through paper products, copies its image and therefore the significance of the primary instrument of humans and guarantees the genuineness of the products contained, supports with shapes inspired by natural elements, and much more).

FIG. 6. HANDEAT.
SINGLE MATERIAL SUPPORT IN CARDBOARD FOR TASTING TYPICAL PRODUCTS, INTERPRETED AT A FORMAL LEVEL IN THE IMAGE OF THE HAND AS THE PRIMARY INSTRUMENT OF HUMANS AND THE SYMBOL OF CRAFTSMANSHIP, BUT ALSO AS AN INTERNATIONAL VEHICLE OF COMMUNICATION.
DESIGN: R. CAMPAGNARO, A. CAPASSO, I. PIVARO, M. REMONDINO.

FIG. 7. 4 IN 1.
SYSTEM FOR TASTING AND TRANSPORTING FOUR DIFFERENT QUALITIES OF WINE. CREATED ENTIRELY IN CORRUGATED CARDBOARD, IT IS ASSEMBLED AT THE TIME OF SALE WITHOUT THE USE OF GLUE POINTS.
DESIGN: M. CORDILLET, R. FISSORE, A. SACCÀ, M. SARTOR.

Communication of the Activity

As already mentioned at the outset, the value of the design activity in the educational area developed in close contact with companies, as well as being found in the specific design proposals, is defined also by the collection and critical interpretation of the results (in terms of the Scenarios and proposals) and communication of the same to a mixed audience, which can range from the specific market of the company, to the academic world, to institutions, to society at large. It must be recalled that operations of this nature, though responding to a specific brief and giving rise to concrete proposals, make the cultural action the main objective, even more so if the themes developed and the external operators involved are connected to a market of a social and cultural nature. In addition, the very great variety of proposals and approaches determines the clear difference from an operation of a classical professional nature, where, in response to an explicit problem, a specific solution is proposed.

In this context, the act of communication therefore tends to follow not so much traditional channels of a commercial nature, but systems of a "cultural" type, such as the creation of exhibitions and shows, the publication of articles in specific journals, books which by recounting the activity, the results achieved and future scenarios are put forward to enhance the debate on the issue in question. In this perspective, the final papers of both experiences recounted here are exhibited: the first, with the exhibition *40 Anni di Amiat* held from 8 to 22 October 2009, in the Sala delle Colonne at the Castello del Valentino, Torino; the second with the exhibition easyEATING, Systems for Transporting and Consuming Food and Wine Products, from 21 to 25 October 2010 at the Low Environmental Impact Events at the 8th edition of Turin's Salone Internazionale del Gusto. The results were also collected, respectively, for the catalogue *40 Anni di Amiat. Progetti di logo e merchandising per l'anniversario dell'azienda* and for the publication *easyEATING. Sustainable paper packaging for traditional produce*), edited by Marco Bozzola, Dativo editions.
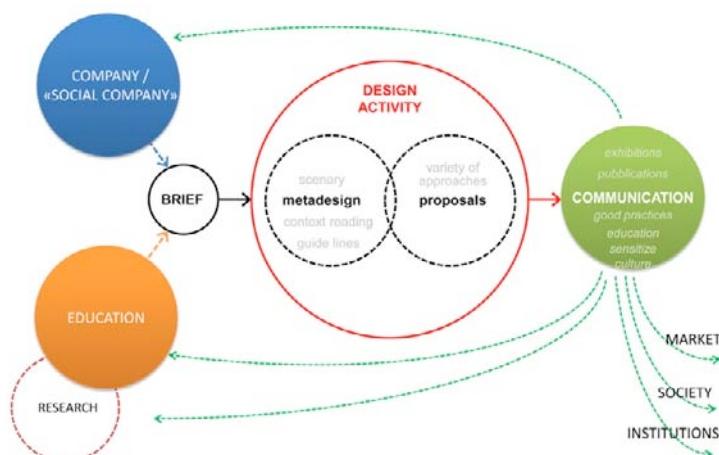

FIG. 8. ACTIVITY PROCESS.

PROJECT ACTION FOR AGE2. DESIGN PROCESS IN SERVICE DESIGN

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This paper aims to show the design process of a project developed by the design students of the Universidade de Aveiro. The project is part of a wider challenge launched to all Portuguese design universities called "Action for Age". This initiative intends to raise awareness amongst young designers to the problematic of population ageing and its consequent social transformations. It is intended to showcase new approaches to the design process, focusing in Service Design, contributing towards the consolidation of an emerging field in the design area.

As a brief, the students were asked to identify a place and design a solution that would stimulate intergenerational relationships. Students were prompted to define their own brief, which led them to develop flexible solutions: a service, a network, an object, a shop, an initiative. The purpose was to conceive an integrated solution that could respond to the identified need of enhancing intergenerational relationships, resulting in better integration of the elderly, as well as other individuals, in the community.

To kick off the project, students had to pinpoint a place and its ongoing activities. Those activities were regarded as social innovations, and as such their goal was to analyse them thoroughly and propose ways to strengthen and connect them.

On a second phase, students were engaged in scenarios building, which worked as a tool to facilitate a strategic discussion amongst the different stakeholders involved, and later designed the toolkits that would enable the implementation of those scenarios. The results of these projects will be presented, although the focus of this paper is more the process and tools used for their development.

••• Service design, social innovations, ageing and intergenerational relationships •••

1. CONTEXT

1.1 *Ageing Society*

Global population ageing is a well-documented fact. The success of the health policies implemented in the last decades will be reflected in a world's population that, in 2050, will comprise around two thousand million senior citizens [Pinto, T. A. et al, 2009], that is, a number equal to that of the entire world's population about 50 years ago . That alone raises a number of pertinent social problematics, namely the emerging signs of tension between generations, which undoubtedly implies rethinking the way modern societies are organised. Even the welfare state is under threat, precisely due to the critical unbalance between the retired and the active populations.

Simultaneously, there is a marked trend towards the urbanisation of the world's population. The consis¬tent movement of people from rural to urban areas means that in today's Europe, for instance, 75% of its total population lives in urban areas, and it is estimated that in 2050 that number will reach 83% .

This social change becomes particularly worrying between senior age groups, mostly on the level of families' cohesion and the ability to maintain the remaining social networks consolidated throughout life. The organization of the urban space, the new professional paradigms and high mobility, all have been contributing for the disappearance of the extended family's concept, the interdependency between family members, by and large what guarantees to its older members the necessary support in the last phase of their lives.

If, besides this aspect, we factor in other elements, such as the significant life expectancy difference between men and women, the abrupt breakup in social relations after retirement, feelings of insecurity, inadequacy or fear due to the loss of psychological and motor skills, we realize that the tendency for isolation increases and that when this estrangement between the individual and its community becomes established, the very perception of their level of social interaction also decreases, driving them, in extreme cases, to loneliness. It is therefore essential to intervene to maintain and reinforce solid social ties, typical of communities where relationship dependencies are clearly established and where the support between members is established, in other words, wealthy in what is presently known as social capital. In order to do so it is important to invest in the promotion of intergenerational practices, authentic and honest, based on dynamic and sustainable social networks, allowing the elderly to maintain an active role in society for longer, thus potentiating a rich human capital that nowadays is widely wasted [Experimentadesign, 2009].

Building on these premises, if we can also act on the promotion of intergenerational relations, through the development of solid and entrepreneurial social networks, we can aspire to convert this phase of life into an even richer experience for all.

1.2. *Designers' Role in today's world*

In an interview filmed for his 1969 Paris exhibition, "What is Design?" at the Musée des Arts Décoratifs, Charles Eames was asked: "What are the boundaries of design?" His

response was: "What are the boundaries of problems?"

The world we are living in is complex [Thackara, J. 2005] and everybody in it designs [Papanek, V. J. 1972]. This apparently simple proposition locks the elements articulating the debate on design's and designers' role in contemporaneity. If we consider that everybody designs and that issues are ever more complex and ambiguous, calling for holistic and all-embracing strategies for their tackling, this means that designers need to update their practices to actively participate in the mesh of designing networks that characterise contemporary society, feeding them with their specific design knowledge: design skills, capabilities and sensitivities [Jégou, F. & Manzini, E. 2008].

In this context, a new idea of design activity is emerging. For instance, RED [Burns, C. et al, 2006] is applying design in new contexts, using designers' core skills and the design process to transform the ways in which the public interacts with systems, services, organisations and policies. Manzini [Jégou, F. & Manzini, E. 2008] believes that a new design activity is emerging and to participate designers have to positively accept that they can no longer aspire to a monopoly on design, and if appropriately harnessed this change in the designer's place in society is not reducing their role but, on the contrary, it is increasing it, endowing it with the responsibility of being a key driver of social innovation. And Thackara [2005] argues that designers have to enhance the ability of all citizens to engage in meaningful dialogue about their environment and context, and foster new relationships between the people who make things and the people who use them, as design should be about delivering value to people.

What we see in this approach is that it places the individual at the core of new solutions, and builds the capacity to innovate into organizations and institutions. This new approach could be key to solving many of society's most complex problems, but its emergence is not without controversy. There are those who argue that it's not design because it doesn't look or feel much like design in the familiar sense of the word - its outputs aren't always tangible, and may be adapted and altered by people as they use them [Burns, C. et al, 2006].

Nevertheless, and even if controversial, there are several projects developed by diverse institutions, companies and designers. Cases such as the RCA Helen Hamlyn Centre that works with a range of academic and business partners, whose core research focus is the study and application of Inclusive Design through a more socially inclusive approach to design, and DesignAge, that explores design for ageing populations.

Another example is Dott 07 (Design of the time 2007), a year of community projects, events and exhibitions based in North East England, which explores how life in a sustainable region could be like – and how design could help us get there.

Several projects were delivered in partnership with Culture10, based at NewcastleGateshead Initiative, and ThinkPublic, a social design agency that helps tackle big social challenges working with the public sector, third sector and communities. Dott 07 projects aimed to improve five aspects of daily life: movement, health, food, school and energy.

In Portugal, for instances, the Calouste Gulbenkian Foundation sponsors intergenerational projects, involving different organisations and institutions, highlighting the cooperation with Design professionals.

1.3. Action For Age Project

Along with these projects, the Action for Age (AfA) iniative was created in 2009 by the Royal Society for the Encouragement of Arts, Manufactures and Commerce in the United Kingdom, and subsequently implemented in Portugal in partnership with the Experimenta Design, supported by the Calouste Gulbenkian Foundation and the public charitable organisation Santa Casa da Misericórdia de Lisboa.

The work proposal presented, adapted from the original brief so as to adjust it to the Portuguese reality and now named Action For Age 2, had as departing point the identification of a place where to intervene (district, association, company, …) and, in that specific context, the design of a proposal that would stimulate intergenerational relations translated in clear improvements to the quality of life of the elderly. Topics such as loneliness and social isolation were signalled as central, as well as the concern that the whole intervention, sustainable and sustained in reality, was translated in clear benefits, transverse to the whole society. On the other hand, the involvement of users in the final design of flexible solutions was highlighted, be it products, communication plans, scenarios, networks, services or occasional and ephemeral initiatives.

What is the role of design in view of the "complex challenges brought about by the phenomenon of the generalized ageing of the population "? [Experimentadesign, 2009]. This was the central question of the challenge proposed to the schools of design.

2. AFA PROJECT AT THE UNIVERSITY OF AVEIRO

The teachers of the subject Project inDesign IV (Teresa Franqueira, Gonçalo Gomes e Rui Costa) regarded the ExperimentaDesign challenge as an opportunity to explore new approaches to the project praxis. The different professional backgrounds (Industrial Design, Service Design and Graphic Design) have allowed for the synergies created in the Project Design class of the University of Aveiro to be strengthened and enhanced with new methodological approaches. In fact, Design at the University of Aveiro has the peculiarity of merging all design fields in one.

2.1. Design at the University of Aveiro

Education in Design at the University of Aveiro is organized "around a structure that recognizes in the trilogy author, technology and programme, the three main points of view of project in design. It promotes "knowing how to think" as a basic requirement of "knowing how to do", and emphasises the dual aspect of this relationship in the cognitive construction"[Franqueira, T. 2009].

In order to attain a progressive autonomy of students, the axis of projects proposed during the three years of the degree course progresses from the semantics to the syntax, and from syntax to pragmatics. It is in the scope of pragmatics, during the third and final year, that the pertinence of the AfA initiative becomes apparent.

In fact, a close proximity between the objectives of the discipline and the goals set by AfA is noticeable. Firstly because students themselves are asked to define their scope of action, following the idea that the programme is the "project's authorial partner". The answer to specific and already identified problems in the context of senior citizens' inclusion would be a very good challenge for a student finalist in design. Some of the examples mentioned before (HHC, Dott, etc.) allow to understand the role of the designer in a society that resolves problems raising new ones in the process. The focus of the project in intergenerationality identifies a question, without predefining the programme. This is regarded as the main difficulty of this project, and perhaps the characteristic that brings it closer to the conception of design postulated in the University of Aveiro – a supra functional artefact of communication.

2.2 The Design Process

Starting with around 50 students, and having as main objective the development of a project that should mirror the projectual practices of a design atelier, the class was divided in groups of seven students, and a specific area of the city of Aveiro was assigned to each group, following a previous geographical division of the city in seven different areas.

To strengthen the work dynamics, each group was asked to choose on a team leader on a weekly basis, whose job would be to set and monitor the strategies and priorities during the week he was in charge. This function would be assigned in a rotation scheme, and each week a new leader was to be designated.

First Step

In a first phase, the groups were asked to conduct an exhaustive research of their area, followed by a description, representation and analysis of the data obtained. In this specific task, all groups opted for the use ethnographic approaches to collect information, conducting detailed audiovisual and photographic inventories, as well as a series of interviews to the resident population and small businesses.

These data collection allowed them to understand the singularities of each particular area and its unique potential within the scope of the proposal.

The data collected, besides being recorded and stored as potentially relevant information, were also entered in the GoogleMaps (Figure 1, 2 and 3), platform, so as to originate a map of activities available to the whole class. This enabled the crossing of information between groups, and thus the cross-fertilization between different projects' ideas and useful information. Since geographic delimitations are "blind", these information exchanges
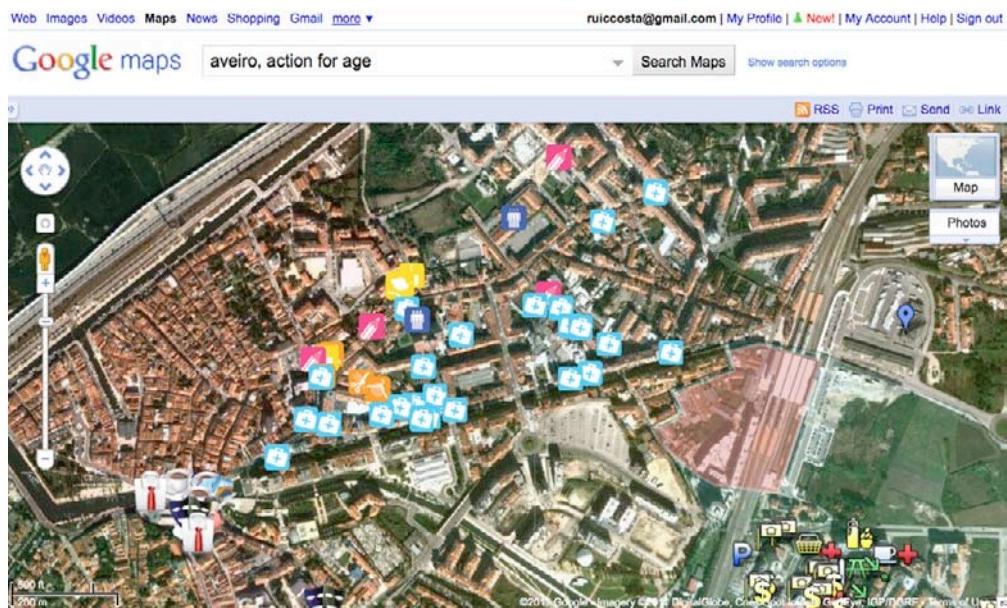
FIG. 1. GOOGLEMAPS.
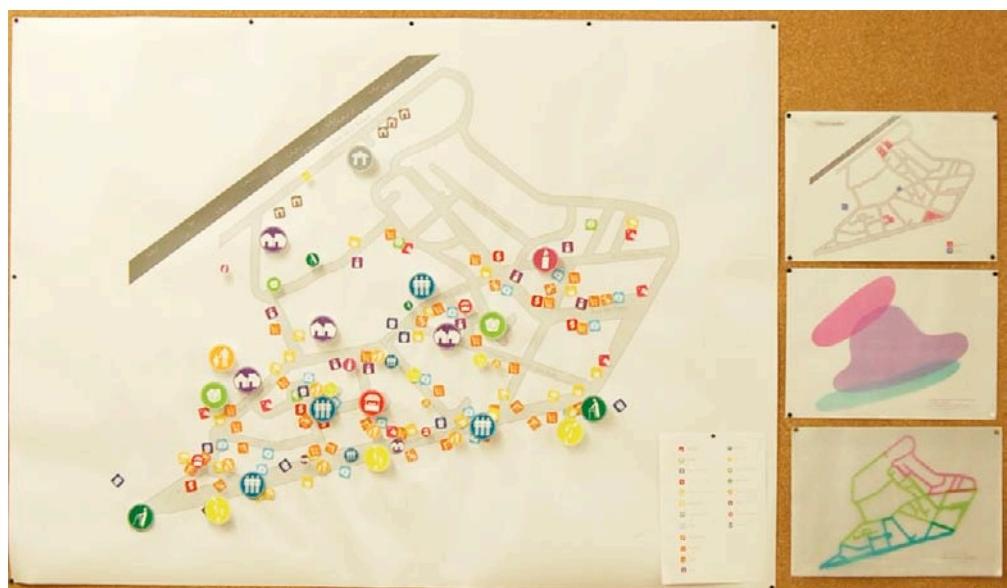
FIG. 2. ACTIVITIES' MAPPING.

FIG. 3. DETAIL OF ACTIVITIES MAPPING.

enabled all groups to understand the network of associations or entities transversal to, and affecting, the whole city. This tool also helped in the definition of a more detailed research strategy, in the identification of problems and opportunities, allowing them to constantly refine the interactive map.

Second Step

In a second phase, the groups had to define the scripts for their projects' development. The identification of needs and opportunities specific to each area of the city led them to propose different fields of action, always with design's scope and vision. The scripts' design and the justification for the central role the designer should play in these initiatives has been the main challenge for the teams. The first proposals opened a lively debate between students and teachers, extended also to professionals coming from different areas, so as to guarantee a multidisciplinary approach. To reinforce the project's transverseness, experts in gerontology, children's education and health researchers from the University of Aveiro were involved. The importance of this external collaboration was key to support the scripts' soundness, especially thanks to the confrontation with external and specialized opinions on the topics analysed.

The initial drafts were prepared and worked as a pre-definition of the whole product-service system presented, and as a way of identifying the different stakeholders involved and their specific roles. As a test to the soundness of these first solutions, an intermediate evaluation was a role-playing session (figures 4, and 5). Starting with the identification of

FIG. 4. ROLE PLAYING.

FIG. 5. ROLE PLAYING.

the stakeholders and their inherent roles, this role playing session intended to identify the weaknesses of the service proposed, and, at the same time, to develop a more realistic approach to the very project.

This phase turned out to be crucial for the development of the project. It was from this point forward that the students fully realised that their decisions as designers are the result of interactions, whose complexity is difficult to apprehend from the analysis of bidimensional schemes only. New discussions arose around the briefs, concurring for their enhancement and fine-tuning, which ultimately helped each team to present the proposal of the virtual and physical elements, events or strategies they regarded as essential for the pertinent and sustainable implementation of their projects.

Third Step

In this phase the students worked individually in the development of the several supports previously defined as necessary. Although they continued to work as teams, the assignment of individual responsibility in the development of each piece of the final puzzle enabled the assessment of their conceptual and technical proficiency and competence on the part of the teaching team, a goal that was previously signalled by the teachers. .It was very rewarding to verify that the diversity of proposals was very heterogeneous , partly due to the specificities of the strategies defined upstream and partly to the geographic, social and economic context of each project. In a final moment, the students went back to the field to present the scenarios they had developed to the local populations, and did so trough interviews to obtain feedback that would confirm (or invalidate) the solutions they designed previously.

3. RESULTS

In an academic context, the results are always more than what is strictly produced, namely in terms of references, methods and techniques applied. Alongside the physical outcomes, these steps become, for students, the very memory of the project. We will discuss here only what has been produced, material and immaterial.

Each group's different approach was of course limited by the characteristics of the area studied. In most cases, the first contacts determined the sort of project developed. Besides the "mandatory figures", that are mainly learning exercises (visual identity, printed or digital communication media, etc.), the diversity of proposed solutions and the understanding of the different triggers of those solutions is a very important step to know what "Program" means in the context of Design graduation.

FIG. 6. AGE PROJECT.

3.1. Age!

The area assigned to group B is the business core of Aveiro. The former building of the Town Hall, Court, Cathedral, Theatre, Highschool, Museum, all these equipments are located here. In these context of businesses, services and cultural offer, intergenerationality is fairly natural. The group therefore opted to circumscribe their intervention to a square where the Theatre, the (former) Town Hall, the Highschool and some small businesses converge.

The first difficulty was the argument: What could be done, in terms of intergenerationality, in an area where most activities are work related or motivated? The group decided to consider the square as a centre of planned interactions, through the continuous animation of the site. This would imply the creation of synergies between the different entities involved, that could, for instances, offer in a specific day of the week, every week, a different activity. This network of events would certainly attract people to the square and promote interactions.

From a design point of view, besides that possible network of contacts and co-productions, the design of specific outdoors furniture for the square is very interesting. The solutions proposed, namely for resting, were designed regarding the different kinds of posture and age of expected users. Trying to adapt or to induce ways of inhabiting and living a space through its forms is a role that both design and architecture have always played and a very interesting issue raised in this project. The design of the forms to live the square, to sit or to lean, to play or to flirt, to read or simply to see other people. These are the expectations that sustain this argument.

3.2. . . . com amor se paga

This project established the framework for the creation of a services' and trade network between the residents in that neighbourhood (Barrocas). Following the identification of

FIG. 7. ALFRESCO PROJECT.

an already existing but incipient network of friendly exchanges of goods between neighbours – goods produced by themselves, like vegetables, eggs, fruit – this group proposed the creation of a system that would acknowledge and enhance the social significance of these relations as pillars of the community. The upgrading of these incipient and isolated behaviours into constant, acknowledged and dynamic practices, implies that these people would play a major role, as founders of new (old) ways of relating in a urban neighbourhood, regardless of age or profession. As Papanek said: "everybody (…) designs".

3.3. Megafone

To this group was assigned an area characterized by the existence of a council housing estate linked with recurring criminality, which taints all its inhabitants with an undeserved notoriety.

This was the guiding principle for the action of this group, to fight the stigma associated to this council housing neighbourhood. Their proposal was based in the idea of creating a sense of belonging to a community that includes different generations, different professions, different backgrounds, but who, by being afraid of reaching out for other people, become isolated, thus increasing the discontinuities in their neighbourhood.

The project's principle is that you can look at what surrounds you in a different way. Through the distribution of disposable photo cameras between the residents it was intended to get an inside look on the neighbourhood's life, to record the daily life of its residents.

FIG. 8. FAIISCA PROJECT.

The following step would be to show some of those images in a public space. Images of regular spaces, ordinary people, but with a name, a profession, an origin. It is a sort of amplification of something that already exists and, in truth, nearly nothing is designed in this project: the contents are there, ready to be given value through a different look.

3.4 Cor

In the stride of urban regeneration, a project that aimed to promote the reuse of abandoned houses and revitalize the most rundown and aged areas of the city was also presented (Cor Project –Colour Project). For that purpose the students designed a service ⁄ a network of contacts ⁄ through which the owners of empty houses could get in contact with prospective tenants, mainly young creative professionals trying to kick⁄start their careers. The central idea was the renting of the available spaces for a low cost, or for its simple regeneration, and its goal was to attract younger residents and, though them, to socially regenerate the area under intervention.

3.5 Alfresco

One of the student's groups ⁄ the Alfresco Project⁄, proposed, for example, a green zone as a daily use equipment, where the most diverse events could take place, and thus, through a series of coordinated actions and specific urban outdoors' furniture, promote the interac⁄tion between users of different generations in the same space.
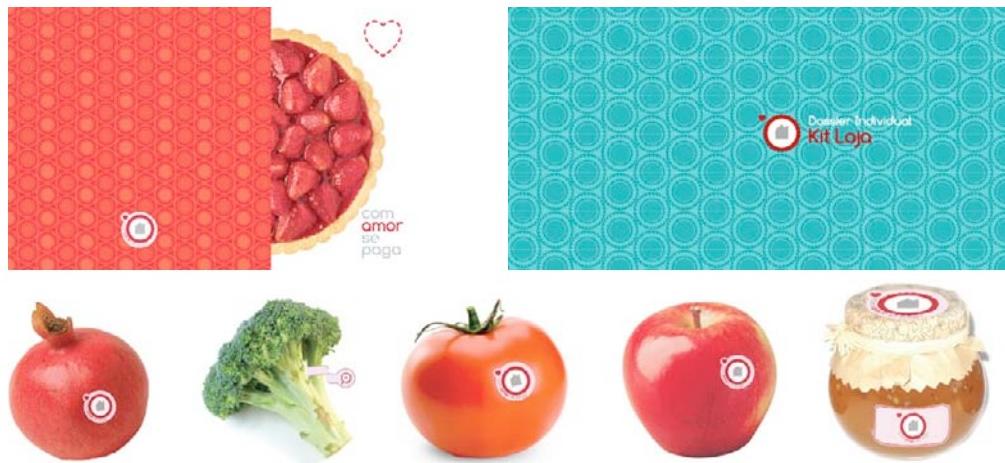
FIG. 9. ..COM AMOR SE PAGA PROJECT.

FIG. 10. COR PROJECT.

FIG. 11. RAIZES PROJECT.

3.6 Raízes

Another proposal within the theme of green spaces and outdoors, the Raízes project (Roots Project), pointed at the "conquering" of the territory by the resident population by planting trees (with a previously planned order and layout) and by doing so, experiencing that space as their own. The aim was to promote a closer and long lasting relationship with the city that would lead, in the long run, to a true "city park" in the literal sense of the words, a park built by its citizens.

3.7 Faiisca

At last, another group of students – Faiisca project (Spark project) focussed its intervention in getting the most out of "forced leisure". Having as starting point the 'citizen's shop' of Aveiro, a place where one can find a series of public and private services and where the waiting times are often too long, the main argument of this group was to seize the random meetings that the space generates, igniting and transforming them in dynamic social relationships. For that, a series of interactive situations were proposed, from games to interactive walls, with which the different users of the place, old or new, could interact. This collaboration between individuals is of central importance for the activities to be carried out.

4. THE SELECTED PROPOSALS

The original project, presented by Experimentadesign, foresaw the existence of a second phase in which the twelve best proposals, submitted by the various schools, would be financed with a grant of 2500 euros in order to prototype the solution. Out of the seven projects developed in the Universidade de Aveiro, five were submitted to the jury and, of these, three were approved, advancing thus for this second stage.

Therefore, students responsible for the proposals: ... Com Amor se Paga (Figure 9), COR (Figure 10) and Raízes (Figure 11), found themselves involved in a series of workshops where both the weaknesses and strengths of their projects were to be addressed, incorporating insights based on co-design methodologies, defining concrete outputs for their projects and planning the necessary tests for the physical implementation of each proposal. These workshops were directed by the designers Renato Bispo (Experimentadesign), Susana António (Think Public / Portugal) and Vincenzo Di Maria (CommonGround / UK) and also involved the majority of the teachers who accompanied the students on the first phase of the initiative.

A mentor was assigned to each group, responsible for the external monitoring of the projects' implementation on the field. Several collaborative work tools were established, such as Google Calendar and Google Docs, where all groups could have access to the information on all work in progress. Skype was the privileged tool of communication, especially between the mentors and the groups.

In these "distance" mentoring sessions, the impact of the already implemented activities

were discuss, as well as the main challenges of the project at that exact moment and the work plan for the weeks to come. The final outputs for each project were also constantly "tuned" and the SWOT (Strengths, Weakness, Opportunities and Threats) matrix re-adjusted, taking into account the real progress of the project. Mentors also traveled to the site to closely monitor the implementation of the designed solutions, and to work with the students on the most effective responses, given the specificities of each context.

On the teachers' side there has always been a close monitoring, its primary purpose being the validation of the projects' outputs at the local level, but also to support its budget execution, activities' implementation and identification of the local partners that could become the projects' long-term sustainers.

This last aspect proved to be particularly important regarding the last workshop, where Experimentadesign prearranged a presentation of all projects to local, national and international potential partners and investors.

A temporary exhibition, entitled "Action for Age 2 - Intergenerational relations", was also organized. As part of the official program of the EXD'11 Biennale, it took place from October 2 to November 27, 2011, at the Calouste Gulbenkian Foundation, and all projects were presented displaying the final results publicly.

This second phase of the "Action For Age" project proved to be truly rewarding for the students involved. It offered the possibility to prototype the solution devised by exposing them to the inherent difficulties in implementing an effective project, to a specific reality and with real actors.

This accrued to the work developed within the classroom, adding significant value, in our opinion, by including a fundamental layer of reality that enriches the entire design process, thereby completing it.

5. CONCLUSIONS

In 1995, Morello [Augusto Morello, 1995] has raised the question of designer's lack of capability to design services, suggesting that the role of the professional designer should be renewed to embrace the new reality and arguing that renewal would entail a deep revisitation of design's conceptions.

New strategies able to introduce new ways of thinking in Design are needed, in order to promote sustainable solutions in the formulation of possible scenarios. This is one of the statements underlying the Design debate nowadays, and the role of design must be updated to achieve that goal. The truth is that if design fails to follow the changes happening in society and continues to build up on product conception serving a declining economy, it will be hopelessly unable to perform its tasks in the arising model of sustainable development.

On the other hand, it is not desirable that design becomes "hostage" of these changes. We can not uncritically accept the agenda of politicians, albeit the fact that the key decision makers about what science 'can' investigate has been European funding. Whatever the

problem of a given society, the design discipline, in the context of training, should be a vehicle for reflection on the social and economic culture in which it intervenes. Through this project proposal we have tried an approach that we think is the appropriate one to face a more complex reality, complexity that inevitably also affects design.

One of the conclusions to draw from this project, based solely in product-service systems, was the reinforcement of a design's holistic vision.

Whatever its field or area of intervention, the tools used by designers are still the same: the structure, the networks, the materials, the technology, the authorship, the drawing. Always the drawing.

5.1. Future Developments

More than the set of different elements designed to illustrate the proposed projects, which above all played their role as supports of a practice and contents that remains essential to the work of designers – the visual structure, composition, colour, scale, materials, ergonomics, the sensibility to choose one shape instead of another, the mock-up, the drawing once more – it is important to enhance the flexibility of some of the proposed systems. Initially designed for an exact location, but applicable (when well designed) to any place, city or country where the diagnosis is similar, the modularity in the design of these systems also allows specific implementations, appropriate to the scale, time or uses of various contexts. Therefore it is necessary, in the immediate future, to "move away" from the place that triggered each argument and analyze what was proposed from a designer's perspective (possibly different from the standpoint of a social worker, a physician, a mayor, a gerontologist...). Envisaging design as a fertile ground of experiences, whose implementation can and must ulteriorly be complemented with other actors. Again, design as a cultural interface with society...

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PLAYING WITH PACKAGING. A COLLABORATIVE DESIGN EXPERIENCE BETWEEN UNIVERSITY AND COMPANY

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The education of design and of the professions that fall under the "culture of project" is being studied by several researchers. In the 1980s, Donald Schön investigated with great interest the teaching in architectural design studios (1983, 1987). Schön managed to advance in the teaching-learning by proposing the theory of "reflection-in-action". However, universities in general are often displaced from the social reality in which they operate due to their strong academic tradition. This article starts from a view of the process of innovation driven by design to achieve a reflection of how the relationship between universities and organizations can play an important role in this context. To do so it is presented as a collaborative work between the Unisinos School of Design and Litocromart, a graphics services company, specialized in developing and printing packages. At the end we present some conclusions about this experience, which might assist others in making future collaborative projects of this type.

••• Innovation, collaborative design, university, company •••

INTRODUCTION

Design today is considered an essential element for companies that aim to achieve innovation. However, for an effective integration of design inside the companies it is necessary for the administration of these organizations to understand the culture of design that underpins the innovative potential of design and to learn how to explore its potential. Organizations whose business is design, usually larger ones, are from time to time involved in developing a dialogue between the business culture and project culture, aiming at a deep

integration of design in the organizational net (FRANZATO, 2010). It is still problematic, however, the viability of this dialogue in small and medium businesses without direct interest in design. Limiting our analysis to these organizations, the objective of this paper is to discuss whether the University can facilitate dialogue between the company's culture and the culture of design. In this sense, the article seeks to explore the potential of particular learning activities.

For this purpose, we analyze one case of the partnership held during the years of 2009 until 2011, between the Unisinos School of Design and the graphics service company Litocromart, with the involvement of different educational activities of various academic levels. The article starts from a literature review on the relationship between design and innovation, introduces the concept of innovation driven by design and the process cycle at its base. The following is the study of the partnership considered its division into four process cycles. Finally it is presented the discussions on the results, highlighting the value of collaborations between universities and companies.

1. THE DESING DRIVEN INNOVATION PROCESS

In manufacturing companies, and increasingly often also in the tertiary sector companies, design has become a major resource for business innovation. Roberto Verganti (2009, 152) indicates the possibility of an "innovation driven by design", based on the designer's ability to become agent of exchange between organizations and society.

Design represents a new path to innovation, and in this context it is essential that companies learn to manage it (BORJA DE MOZOTA, 2003). Design should move from the operating levels - related to the development of new products - to strategic levels, related to corporate governance. This view of design, according to Zurlo can be called "strategic design" (ZURLO, 2004, 2010). In other words, designed used to be interpreted only as a task in the development of new products, today it is believed that it can spread its design thinking in a capillary form in the organization and, especially, in its administration, proposing the project as a new paradigm of innovation (BROWN, 2009).

This process of innovation driven by design, as described by Marzano (2007), seeks to reconsider the overall performance of companies in the market and society. Generally, the intent of this process is the definition of new scenarios of competitive performance for organizations. These processes are aimed at meeting an unprecedented point of view, alternative or future, about the contexts of business, but also the generation of visions that can show the possibilities that could open up if a certain point of view was applied. The ultimate goal of this process is to identify a feasible path of innovation, allowing the organization a coherent development.

The process of innovation driven by design (Figure 1) begins with the identification of a problem by the organization - the briefing. Then four steps are carried out: research, analysis, synthesis and implementation, which are best described as follows:

• Research (acquisition of knowledge on the project subject): In this step it is performed preliminary research aimed at collecting data essential to accomplish the project, for example, the ones called Contextual Research and Blue Sky Research. Such studies focus on the company (identity, portfolio of products and services, productive skills, intellectual capital, etc.), in the context of performance (market, audience, etc.), besides the development of a unique and comprehensive reference set about design (emerging trends, creative stimuli, exemplary projects, etc.).
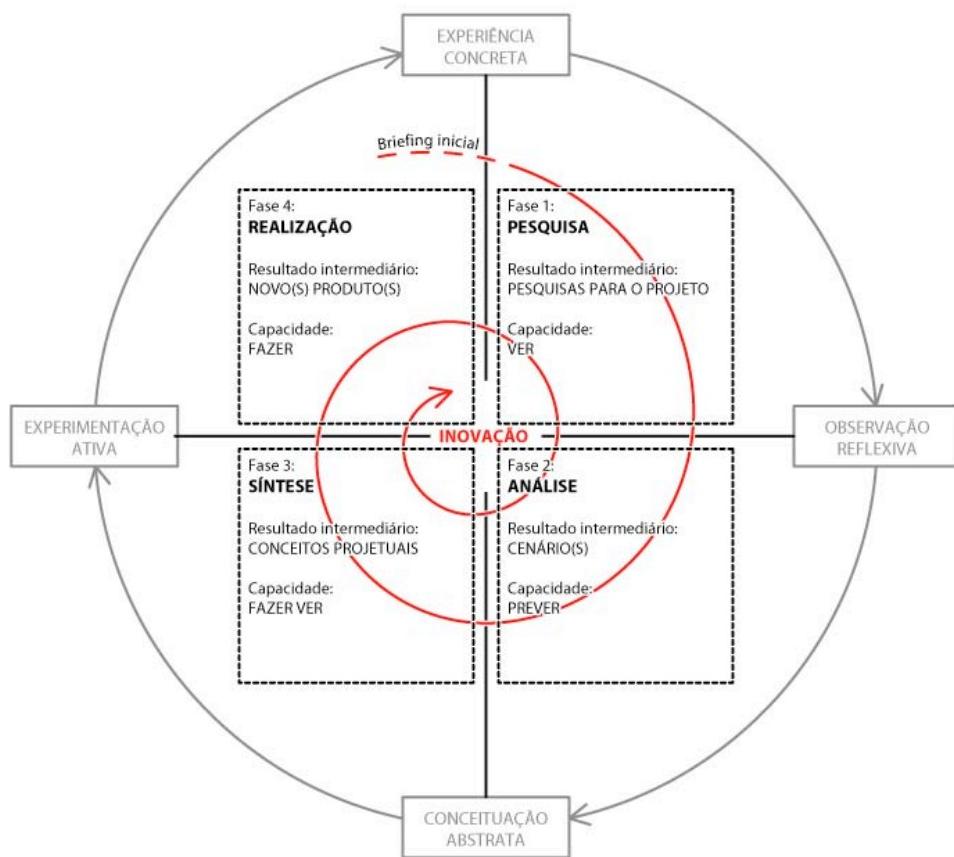
FIG. 1. THE SPIRAL OF INNOVATION DRIVEN BY DESIGN (SOURCE: FRANZATO, 2011).

• Analysis (scenario building): In this step, the collected data is established with the aim of delineating new paths for innovation and building new scenarios of business activity, alternative to the current. Such scenarios are discussed among the various project participants to jointly decide which path should be taken.

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• Synthesis (design concepts): In this stage, the ideas and knowledge gathered are matured in various design concepts, for example, embryos of new products and services that the designer intends to propose to the company. As in scenario building, the concepts are also discussed to choose which of them to perform.
• Realization (project development): In this phase, the chosen concept is detailed, in order to proceed with the planning, production and marketing of the new products and services.

As suggested by the spiral in the scheme of Figure 1, after the first process, the others follow cyclically: when developing a project, the designer solves a particular project problem and identify additional issues that the company may face in the future. Thus, the designer encourages the company to pursue research and design, making it crucial to search for continuous innovation. In this process, the completion of the first three steps is due to the designer or design team, corresponding to what Zurlo (2010) calls to *see*, *predict* and *make see*. The fourth step is critical to the success of the project and corresponds to *make*, which, unlike the three previous steps, its realization is the responsibility of the organization.

Next, it is presented how the concept of design-driven innovation has been pursued and encouraged at the Unisinos School of Design, in southern Brazil, through actions that aim to integrate the academic world to the business context. It is also presented a case of this specific integration.

2. THE CASE BINO: PLAYING WITH THE PACKAGE

The Unisinos School of Design seeks to develop partnerships with businesses and other organizations, exploring the potential of educational activities that incubates. Thus, students are afforded the opportunity to work on real cases, while organizations fertilization is provided with ideas and projects developed by an outside look at their routine.

These experiences are developed using the methodological approach of the metaproject (CELASCHI, DESERTI, 2007, DE MORAES, 2010), aimed at exploring regular trajectories of innovation to business partners. Moreover, case studies represent important concepts proposed. Among the many cases already developed, this article discusses the partnership with Litocromart graphics, as this has unfolded in several projects cycles over three years. This collaboration allows us to evaluate the progress of the dialogue between company culture and design culture through academic activities and the degree of innovation thus afforded. Each project cycle was evaluated as a whole, its four steps - presented in the previous section, and finally, their intermediate and final results.

Following it is presented the two organizations involved in the case, the Unisinos School of Design and Litocromart graphics, as well as three project cycles already developed, plus a fourth cycle in the planning stage.

2.1 Unisinos School of Design

The Unisinos School of Design ⁄ EDU ⁄ was designed in the context of cooperation be⁄tween the Politecnico di Milano and Unisinos, based on the view that design is a "process of innovation that creates value for society" (LIBERALI, 2008, 19). Its proposal was based on principles of internationalization, innovation and integration between universi⁄ties, business and society, and its activities are carried out in undergraduate and postgradu⁄ate levels, plus research and consulting services. In addition, the EDU "promotes eco⁄nomic and strategic innovation of the several local productive sectors and cultural reality of Rio Grande do Sul" (LIBERALI, 2008, 19), Brazilian state of the school.

To Borba, Galisai and Reyes (2008) in Unisinos School of Design the research and teach⁄ing propose a permanent dialogue with society and industry, ensuring a new form of sus⁄tainable development. The school should provide the students with learning tools and methodologies that help then to address to the needs of the market. For the authors, few courses are aware that isolation (social and production system) is dangerous and not sus⁄tainable (Borba et al; 2008). Finally, these authors define four fundaments that govern the relationship between universities and companies:

• To enable dialogue between universities and innovative organizations;
• To establish real experiences to students;
• To bring future talent to organizations;
• To establish a permanent bond that promotes the culture of project.

2.2 Litocromart Graphics

Litocromart graphics is located in the Industrial District of Cachoeirinha in Rio Grande do Sul, and works since 1955. Currently works with the production of packaging and many of its customers are the from pharmaceutical and food industries, which demonstrates competence and development of quality products that meet strict standards in these sectors. This is a large company, with high annual production output. Its main raw material are duplex, triplex and micro⁄waved cards. In its technological capabilities, Litocromart has availability of several processes such as offset printing, printing of metal strips and special stamps (such as those required for packaging of medicines), die⁄cutting, special knives, folding, gluing, lamination, located varnish, among other special finishes. The machinery of the company is constantly expanding mainly in the area of printing.

The company sought the EDU in 2009 in order to develop a totally new business, which would move the company from a *business to business* to a *business to consumer* format. As a secondary objective, the company was interested in developing a brand called "Bino", for the marketing of paper toys that could be manufactured within the company's factory, exploring new possibilities for its communication and marketing. Considering the limited resources that the company could provide, it was chosen to develop the project exploring the teaching activities. Were involved the courses of Bachelor of Design and Master in

FIG. 2. DESIGN CONCEPTS BY THE STUDENTS OF BACHELOR IN DESIGN (SOURCE: PHOTOS TAKEN BY STUDENTS).

Graphic Design. The project unfolded through four project cycles (graduate, internship, undergraduate, extracurricular workshop), where was used the methodology proposed by Celaschi and Deserti (2007).

2.3 First Project Cycle (Bachelor of Design)
In the Unisinos course of Bachelor of Design, the curriculum is organized into Learning Programs (PA), in order to enable a transdisciplinary vision for the development of projects. The central structural element of each Learning Program is the Design Studio. As indicated Scaletsky and Luzzardi,

> "in each PA, the level of complexity of the projects in the studios increases, through the design of products and services, to reach a project for the promotion of a territory. This arrangement allows the university to bring companies into the classroom, allowing students to work with real project bonds and deal with the constraints of the market" (SCALETSKY, LUZZARDI, 2011).

The partnership between Litocromart and the Unisinos School of Design at this level took place in the second half of 2009, in the discipline of "Design Studio 2". The aim was to explore the theme of paper toys, to create some portfolio and develop a brand for this new business. In order to develop teamwork, students were divided into six groups, each composed of three students. The groups developed independently the stages of the design process, exploring the meanings of the word "play." Also, they have focused on different target groups and in different contexts of buying and using, building very different sce-

narios and, above all, original ones.

So as results came luminaire design concepts, stationery objects, toys for children with visual impairments, office objects, souvenirs and games, which shows the range of possible answers in the universe of the research topic (Figure 2). This set of unique designs offered Litocromart a broad range of possibilities for development, and several ways to innovate in your new business.

In this experiment, it was carried out a first project cycle until the synthesis phase, because the main objective was to provide the company a number of proposals for development, but not for its effective development. In this sense, metaprojects researches, scenarios and concepts developed by the students represent a foundation for the company to be based on actual data, make informed decisions, find trading partners, and finally enable the new business.

2.4 Second Project Cycle (internship)

With the aim of enhancing the partnership between the EDU and Litocromart, it was decided to create an object that would express the results of the partnership so far. This object was initially presented in the form of a book, but it should be produced within the company's factory (which does not have binding process), and that somehow, to showed their available technology and manufacturing processes. To realize this activity it was used

FIG. 3. TOY-BOOK DEVELOPED IN THE SECOND PROJECT CYCLE (SOURCE: AUTHORS).

one more feature of the academic curriculum of the Undergraduate Design course: the internship.

Thus, a student in her third and final year, similar to PA2 students, toured the various stages of the design process illustrated earlier until the development of a toy-book, which summarized the results of the previous step (Figure 3). This idea of developing a toy-book came about spontaneously, given the nature of the subject treated in the discipline "Design Studio 2".

In a way, the design of this product represents a second project cycle that keeps a connection to the next, which should lead to the realization of Bino and its brand portfolio of children's products. This contribution collects and organizes the results of the collaboration, providing a valuable tool for discussion, in addition to the work of the students visibility. Furthermore, through this product, the company can offer to its partners and customers a presentation of the developing projects and its commitment to innovation.

2.5 Third Project Cycle (Master in Graphic Design workshop)

This third project cycle sought to develop a graphic identity for the brand "Bino". To that end, it was conducted a three-day workshop with the class of Master in Graphic Design from EDU, where new ideas were generated in a search of a way for Bino, but also for its applications. The results can be seen in Figure 4. This cycle, like the previous two, only advances to the synthesis phase, without being actually made and implemented. The result will be analyzed by the compaby to choose a path to be further developed and it's affective realization.

2.6 Fourth Project Cycle (extracurricular workshop)

At the time of submission of this paper, this activity had not yet been executed, but it consists on a workshop that will gather together undergraduate and master's students towards the

development of paper toys for effective implementation in the production line of Litocromart. Thus, the expected result of this is the fourth project cycle which, is the advance to the realization phase.

This workshop will take place once a week over the first three months of the school year of 2012, and will have as main characteristic the development of new skills for the participants. This training will be held through the exchange by the moderators of the workshop with the students, but also among the students of various levels of the School who will be working together to develop products that will be marketed by Litocromart from the Bino trademark.

3. FINAL REMARKS

The subdivision into four project cycles allows a full investigation of the experience according to the methodology of action-research (KOLB, 1984; FRANZATO, 2011). The results of each cycle offered the experiential basis for thinking of what gave rise to the next cycle. Thus, it was possible to construct a model that triangulates research, education and marketing.

For a company to collaborate with a class of first-year students means to receive fresh ideas and often unpredictable ones. It is the company that must know how to interpret them, helped by teachers who act as translators between the company and the students. It is also essential to understand the potential of ideas in order to be able to transform the ideas of the creative designers into future innovation.

On the other hand, to work with a real company, which operates continuously in the market, means for students to enrich their own academic background with a direct connection to the professional world. The use of these experiences becomes very important to build their portfolios, well-developed, highly original projects and consistent with the proposal. (FRANZATO, FREIRE, 2008).

We could see that the insertion of the company in the educational context can be very productive for both sides. It is clear that collaborations between universities and business carried out through educational activities differ from consultancy project aimed at professionals, like academic-oriented applied research. Through design activities, which must first attend the training purpose, these collaborations aimed at stimulating interesting, comprehensive and far-reaching topics - seeking to go beyond the ephemeral and the logic of profit. We are aware that proposing a briefing that is not fixed to the design of a product, but to a new business, prove interesting opportunities for the company that would probably not be achieved otherwise.

The integration of different levels of the School shows how rich can the relationship of a company be with an educational institution, creating and disseminating knowledge in both a vertical and horizontal ways.

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LINKED PROJECTS IN THE DESIGN SYNTHESIS AND EVALUATION AREA UNIVERSIDAD IBEROAMERICANA AT MÉXICO CITY

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This paper's objective is to present, socialize and share an experience in teaching ⁄ learning in the graphic design curriculum at the Universidad Iberoamericana. It centres on three linked projects (PV) aimed at solving some design needs of real institutions by means of the techniques taught in Design VI course (Global Image: Identity and Signalectics). The first two agencies: Mexican Confederation of Organizations in Favour of Intellectually Disabled People, A.C. (CONFE) and Exceptional People, AC. (GE) prepare intellectually disabled people to engage in a job, while the project for the third one, Vasconcelos Library (BV), that has the largest store of books in Braille in Mexico City, will focus on the necessities of visually handicapped persons.
The general purposes of these projects were to specifically design the global image for GE as well as apply to the three institutions, CONFE, GE and BV, the expressive iconicity's values required by signalectic designs within our society's cultural context through a signage system.

••• Graphic design, linked projects, synthesis and evaluation area, disabled people •••

INTRODUCTION
An strategy has been developed at the Universidad Iberoamericana (UIA) directly linking those students registered in subjects of the Design course (also known as Design Workshops in other universities) with real projects for companies, organizations or institutions. This educational approach, called *situational teaching*, stems from the Vygotsky's theory and tries to supply adequate solutions to the design problems these entities have. The procedures are known as *linked projects* (PV for its initials in Spanish) and they promote students development as conscious and compromised persons, as they assume a social responsibility.

Additionally, the projects we intend to present were enclosed in the subject of Design VI, pertaining to a major area within the curriculum and departmental structure, corresponding to the prefiguration area. In this subject the analysis, synthesis and management of identity design is developed, besides generating a visual communication strategy and a signalectic system. Likewise, Design VI is located in the Synthesis and Evaluation Area (ASE), which promotes that students integrate, apply and evaluate the acquisition of generic and professional competence and the possibility of implementing this ability in specific situations. It should be noted that ASE is conducted as part of the undergraduate activities necessary to get a Bachelor of Arts Certificate in Graphic Design in three different opportunities: in the 3rd semester, with the subject Editorial Design III (ASE I), in the 6th semester, when dealing with Global Image: Identity and Signalectics (ASE II) and in the 8th semester, while studying Integral Design: Communication Strategy and New Products Development (ASE III)[1].

The paper will be structured as follows: first place, the subject matter of *linked projects*, its definitions and objectives will be dealt with. After that, we will present the Synthesis and Evaluation Area, so that the interrelation of a project of this nature with an area fundamental in our students evaluation is understood.

In the last part of the paper, we will expound, in a systematic, detailed and explicit way, the three study cases mentioned in this section: procedures followed from the projects' beginning, participation and interaction of all the parties involved (subject teachers, Graphic Design coordination, the institution – client- representative and users of the design), complete working procedures implemented with the students, processes and methodological strategies utilized, both theoretical and practical, the creative process, qualitative test performed with users (for example, focus group realized and documented in video or by means of written reports by some groups), evaluation process description and final presentation of the project selected by the institution. In its closure, the document will state the main experiences derived and a series of conclusions.

DEVELOPMENT

a) Linked projects (PV)

Presently, design students training must enable them to face our Mexican society's real and complex problems up. So, since 1994, academic personnel appointed to the Design Department in the Mexico city campus of the UIA committed themselves to study different characteristics that could shape the professional profile of their students in accordance with the new times and circumstances and complying with the principles and objectives of

[1] Part of this document (the Exceptional People, A.C. Case) was presented at the International Colloquium in Design: Design and global changes in local societies, that took place at Toluca, Mexico, on September 23 and 24, 2010. This colloquium was convened by the Autonomous University of the State of Mexico and five other Mexican state universities, together with the Public Administration of the Government of the State of Mexico's Editorial Council.

the Department proper and the UIA (Espinosa, 2009, 12, 20, 22). In this way, accepting *situated cognition* affords didactic and curricular elements in showing the students ways to follow, similar to those they will faced in their professional exercise.

According to Espinosa (2009b, 2) PVs can be taken as *an educational interstice feasible to be applied in Design students professional education, as much in Mexico as in other countries. Besides, it sets up their backing as persons more conscious of their environment and capable of assuming a professional responsibility toward society*. Following the same author, she explains that PV arise because, from the point of view of the Department, design must be a mediation factor between human beings, its culture and the environment in which it evolves. Thanks to the formation she or he receives, a designer is capable of integrate knowledge and skills to solve problems of individuals or of the society through establishing strategies and visualizing objects, in a complex, plural and highly sophisticated world.

In the Design curriculum, PVs pertain to the area of syllabus foreshadowing, which is the essential phase of the design process, being the one in which solution alternatives are evaluated and the one best solving the problem's approach and defined necessities is optimized. Accordingly, subjects in which students develop the analysis and formal experimentation pertaining to design projects concentrate in this area (Espinosa 2009a, 23).

A linked project, as its name shows, looks forward relating design students to diverse active or functional organizations or institutions presenting some specific design problem that can be tackled by them, supervised and supported by a teacher, from the university. Working directly with different institutions by means of a PV allows student to confront the real necessities of clients and final users of a certain design, with regard to an specific group of problems. This approach generates much learning in the students involved with the institution and its problems within the social, economical, cultural, environmental and regulatory context, that is, they undertake the complete design problem, with all its complex structure and formulation.

According to what Espinosa proposes (2009a, 27), implementing students' professional competences is a fundamental and complex part of PVs, an aspect that is possible evaluate through: a) the degree of compromise they show during the project development by their active participation in it and the quality, the quantity of their proposals and way in which they present them. b) The seriousness of their planning and carrying out of project's research and c) the compromise they assume with users and receivers as well as with the client, creating a closeness atmosphere with then, taking into account their approach and including it into the design proposals and the identification and knowledge of the environment from which the needs to solve surge.

The PVs presented in this document were carried out together with the following institutions:

- Mexican Confederation of Organizations in Favor of Intellectually Disabled People, A.C. (CONFE), who looks after intellectually disabled people and trains them in dif-

ferent fields, in order to integrate them into society and improve their way of living. This institution's project required of the design of 47 pictographs and specific signage in its different areas, as well as the creation of a color code for the varied activities, providing in this way an additional element for the correct and fluid displacement of the trainees within its wide and complex architectonic space.

• Exceptional People, AC. (GE), who similarly to the former one, teaches a trade, particularly *tamales*[2] fabrication, to intellectually disabled people, particularly those with Down syndrome, to enabled them for the job market. The requirements of this organization were the design of its institutional image and of a signalectic system, as well as to bring forth some "didactic – informative cells" for its visual factory providing precise information about the production process of the *tamales*.

The Vasconcelos Library attempts to be a modern institution, with advanced technological resources accessible to the widest sectors of population, particularly to visually disabled persons, offering them an opportunity to integrate their educational and for the job training. This client asked for the design of a signalectic system that aesthetically and functionally harmonizes the physical space and the signage with its institutional image, privileging the design for visual disabled people so that they can displace themselves in the same way that those normovisual within the place.

b) Synthesis and Evaluation Area (ASE).

As mentioned in previous paragraphs, the linked projects here presented corresponded to the Synthesis and Evaluation Area (ASE) in its Phase II, where the subject Design VI, Global Image (Identity and Signage) is inserted. This area has as objective that *pupils recover the educational intentions referring to his or her professional formation, to the dimensions of an integral university's training, to social articulation and to achieving generic competences at a transition's level.* In ASE II, starting from an analytical – synthetic exercise, it is assumed a critical position found in the problems, challenges and defies of the professional performance in the local, regional, national and global context (via, 2006, 4).

Among the characteristics of the subjects or curricular spaces of ASE, we find the following: Due to the nature of these maters, the most convenient situation is to have them taught in the school, as in this way they will contribute valuable elements for the student, the program and the university. They are coursatives and cannot be regained or replaced by others. Also, they are serially arranged, having prerequisite subjects. They systematize, synthesize and asses the process of integral universitary formation to which each one pertains. Groups shall be of reduced size, with a maximum capacity of no more than 15 pupils. There are some prerequisites to be able to comply with the implied aims of the area

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[2] A traditional Latin American dish made of a starchy, corn-based dough, which is steamed or boiled in a leaf wrapper.

to which they correspond.

It is desirable that the profile of the teaching staff imparting ASE material is governed by the following characteristics: they have to be capable of conducting group processes and to propitiate collaborative work; they shall promote discussion and reflection processes among the students, as well as procedures favoring self regulation; they shall create a climate of confidence and mutual respect; they shall have a vision of design not only from within the subject (intradisciplinary), but also from the point of view of different disciplines (inter and multidisciplinary) favoring processes of information recuperation and systematization; they shall operate information and communication technologies (ICT); they shall be able to conduct self analysis and self evaluation processes; they shall be capable of interact in an appropriated way in front of contingent situations; they shall act competently in developing an open working ambiance, in which the student person and its formation processes are accepted and respected; they shall systematize, analyze and interpret the teaching – learning processes; they shall identify possible research lines linked to departmental challenges with regard to future developments; they shall be able to develop complex synthesis and evaluation processes and, finally, they shall have a global vision of their own educational process (via, 2006, 4).

It must be mentioned that, at this stage of their formation, designers are in a condition to make arrangements to perform their social service. The linked projects completed for CONFE and GE were incorporated to this modality, which allowed the students participating in them to comply with the requirement of the social service, assuring its conclusion and monitoring.

The three projects described in what follows are integration exercises, as every day life of disabled people, being their disability of a intellectual, physical or sensorial type, include activities such as work, read, move, communicate, eat, dress themselves, have fun themselves and many more implying the satisfaction of diverse needs. Although these needs are identical to those felt by other persons, the limitations that these men and women have must be taken into account, studying the specific requirements that the objects and services they use must comply with.

In Design, there is a concept known as *accessibility*, strongly related to *universal design* or *assistive technologies*. This concept definition refers *to design of products, environments, programs and services that are inherently usable by all people, both without or with disabilities, to the greatest extent possible, without the need for adaptation or specialized design, but it shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.*

The Convention on the Rights of Persons with Disabilities[3] establishes the importance for persons with disabilities *to have an independent way of living and be guaranteed its full enjoyment*

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[3] Office of the United Nations High Commissioner for Human Rights, Convention on the Rights of Persons with Disabilities, http://www2.ohchr.org/english/law/disabilities-convention.htm.

without discrimination. It also states their right to receive and impart information and ideas through all forms of communication of their choice, including by: languages, display of text, Braille, tactile communication, large print, accessible multimedia as well as written, audio, plain-language, human-reader and augmentative and alternative modes, means and formats of communication, including accessible information and communication technology.

STUDY CASES

a) *Mexican Confederation of Organizations in Favor of Intellectually Disabled People, A.C. (CONFE).*

One of its main goals is to raise funds and obtain material and human resources so as to improve the life quality of intellectually disabled people and their families, as well as favor this group integral development and their inclusion in society by means of a national coordinated effort.

Training is imparted in five fields: industrial assembly (storage, packing, conditioning, assembling proper , labeling, codifying and bottling), sewing (cutting and sewing workshop, linen fabrication, packing), cookies fabrication (cookies preparation and production, cookies manufacture, bulk sale of cookies, packing of cookies in different presentations), gardening services (preventive and corrective maintenance of gardens, pruning and weeding, soil preparation, irrigation and fertilization, fumigation), cleaning services (cleaning of shops and offices, toilet cleaning[4]).

The specific objectives for the CONFE's project were:

• Design the signage required in the building and the symbols (47), according to the diverse areas forming the institution, taking into account the intellectual and learning abilities of the people going there and incorporating a color code for the different zones integrating the institution, so that their movements in the place are facilitated.

• General objectives were:

• Reduce the existing confusion among different symbols in the place. Increase and/or improve the facility with which external and internal users move and locate themselves.

• Reinforce CONFE's image as a center with all the necessary infrastructure characteristics (through the help of a SS) for an educational and support center for intellectually disabled people.

• Unify all symbols so as to have an effective signalectic system.

• Produce a Users and Application Manual for the designed system.

b) *Exceptional People, AC. (GE).*

It is an institution to generate a productive project to train young people with the Down syndrome (SD). This association is generally known by the name of *Daunis*, that corresponds to the trade mark under which they sell the tamales made by people with SD.

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[4] Information obtained from www.confe.org.mx/ consulted on September 29, 2011.

This is the training strategy their directives follow in developing the self-sufficiency for an adequate life of the people the institution has at its care. GE's objective is to generate social conscience about the aptitudes disabled persons have and troubles they confront, in order to encourage a new culture of respect, dignity and equal rights for them in the Mexican society[5].

Exceptional People, A.C. has as its mission to train grown-up people affected by SD or with a minor or moderate cerebral injury (exceptional persons they indeed are) in order of obtaining their social inclusion, with a dignified, independent and productive life. Daunis (GE) vision centers in being the leader institution of reference in Mexico regarding the subject of labour and social inclusion of people with the Down syndrome and a model, at World level, of integration with employers. Daunis tries to be a self supporting institution through marketing tamales, so the grown-up people with SD can find companies in which to get a dignified and well remunerated job.

The general objectives for the GE project were:

• Design the Corporative Identity for Exceptional People, A.C., who did not have one of their own then.
• Create the Corporative Image Manual for GE.
• Design applications for GE's stationary.
• Design a signalectic system keeping synergy with the established Identity.
• Develop iconography for the organization and production and the cells in the process of fabrication by means of symbols.

With these activities it was aimed to:

Reduce the existing confusion among different signage used in the place.

Increase and/or improve the facility with which external and internal users move and locate themselves.

Reinforce GE's image as an educational and support center for intellectually disabled people.

Unify all symbols so as to have an effective signalectic program.

Produce a Users and Application Manual for the designed system.

Specific objective: foreshadow the designs for both projects in a manner adequate for the cognitive characteristics and skills of mentally impaired people (Down syndrome and minor mental disabilities).

The *Vasconcelos Library* is a books repository located in the northern part of the Mexican capital, contiguous to the old railroad station of Buenavista and to the Chopo's Cultural Tianguis[6], which is the work of the Mexican architect Alberto Kalach. It is a luminous

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[5] Information obtained from http://www.daunis.org.mx/ consulted on August 29, 2011. Also, from the project ASE II brief.
[6] A tianguis is a traditional market or bazaar, in Mexico and Central America.

place due to the play of transparencies that its glass roof and walls produce. It has three upper levels and a floor plant, being an admirable item of modern architecture. It can hold to a maximum of 5 thousands persons daily, which is equivalent to 4.5 to 5.5 million visitors in a year. Some of its areas and services are: the Multimedia Room, the Children's Room, the Braille Room, with the greatest library for blind and visually impaired people at Mexico City, the Music Hall, the Auditorium, the Multiple Uses Room and rooms accommodating some 640 computers, with free access to Internet. Its mission is to generate policies and establish procedures facilitating fair, free and costless access to knowledge and culture, as well as to encourage reading in the libraries of the National Network of Libraries.

The general objectives for the project were: To design a signalectic system according to the corporative image and restrictions in the use of materials in BV for the floor plant of the institution (complete signalectic), emphasizing inclusion of disabled people, particularly those with impaired vision.

Specific objectives: design of a signalectic system composed of signage for all the areas and services of the BV, industrial design of the signs (format, material and attaching system), solution of the integral system (attached to wall, pending, pennon, self-supporting and labeled on the floor), implementation or seeding, specifying production and location orders, Signage Manual.

Users identified for the three projects (CONFE, GE and BV):

a) Physically disabled people (intellectually, visually and crippling).

b) Non handicapped employees of the institution.

c) General public attending the place.

d) Objectives and benefits of the signalectic system for the three projects (CONFE, GE and BV):

e) A signalectic system has as its objectives inform, address and communicate to diverse users about the different areas in a place in a clear, quick and adequate way, according to their skills and characteristics.

f) The signalectic system shall permit the users' flow within the environment of training, displacement and action.

g) The signalectic system shall show an adequate handling of the iconic values for clear understanding of mentally disabled people and of the Braille system for people with impaired vision in the institution.

h) The signalectic system proposed shall, in a persuasive and clear way, facilitate displacements, understanding of processes and actions taking place in the building.

i) To generate line patterns and symbols production.

j) To generate prototypes for the symbols, cells and signalectic directories required.

k) To generate a Signalectic Manual with the design and production requirements of the system.

PROJECTS DEFIES

To create a Visual Identification System, with its applications, specifically for GE.

To design a signalectic system for CONFE, GE and BV according to the image of these institutions.

To standardize criteria among the teachers involved, in order to reach the goals in time and as they were established.

To be sure that customers will assume their responsibility and the compromise to attend meetings for the taking of decisions during the project, as well as implement promptly the winning project.

To get positive and adequate results for both clients and users.

WORKING METHOD

The process begins at the Social Service Department of the UIA, where the institutions CONFE and GE had to comply with some requisites in order to be considered a client. In the BV case, Dr. Angélica Martínez made the initial contact and it was presented to the Graphic Design Department (DG) later on. In all the three cases, the DG coordination, together with the incumbent professors of Design VI, took the decision of developing the projects.

In meetings with the teachers, the course coordinator, the client and an officer of the Social Service Department participating, the scope of the project is delimited, its brief drawn up and its schedule fixed. These gatherings start some 6 to 8 weeks before the semester ends. In the three cases, there were held plenary sessions with the students, in which the projects were presented, giving them enough information to start it up, together with its scope, quantity and quality of the designs expected and so on.

Once in classroom and having the students known the project, the teacher proposes them to form teams of 2, 3 or 4 people to develop the work. The process starts with a visit to the client installations[7] and an informative talk by a representative of the institution. In parallel, the teams perform diverse bibliographical researches, both theoretical and qualitative about themes related to the project, attend conferences[8], talks and interviews and consult documents in line to back their research.

The GE case started with the development and design of the Corporative Identity (IC). Once the proposals have been finished and qualitatively evaluated, the client was invited to attend a presentation by the students in the classrooms and then select one of the three

[7] Addresses of the three institutions are: CONFE: Carretera México-Toluca 5218 Col. El Yaqui. C.P. 05320 México, D.F. GE: San Luis Potosí #101, Col. Roma Norte, México, D.F. BV: Buenavista C.P. 06350. Eje 1 Norte (Mosqueta), Buenavista, Cuauhtémoc, México, DF.

[8] For example, they attended a talk at the UIA titled: "The rights of intellectually disabled persons. Experience of young people in the Building Bridges Program of the Universidad Panamericana", on March 17, 2010. Also a sensitizing workshop on blindness in the library of the first institution.

options presented by each team. According with the client selection and observations, the pertinent applications for the stationary and all the line patterns were designed. Later on, each team developed the corporative identity manual.

In all the three projects, and according to the governing design concepts of their corporative identities, the design of the corresponding signalectic systems was started (some steps in the process were: free hand sketching, geometrization based in harmonic patterns of the golden section *sectio aurea*, iconic synthesis, graphics, abstraction, and afterwards, vectorization in Illustrator and Pantone application). In this stage, the students focused their work in selecting the material necessary for the signalectic system according to the client requirements and current signage regulations, as well as to the safety, mounting, fixation and cleaning of signs. A materials specialist addressed a talk dealing with these themes to the students and they, based in the information gained at the lecture, the understanding of the NOM's and their own research, proceeded to design the enveloping surfaces following the proxemic formula[9]. Then test of perception by the users were realized and Braille alphabet was incorporated. Some adjustments and design changes were done based in these tests and the definitive prototypes were created.

Once the signs were designed, the chromatic code was selected and the signage was digitally implemented or "sown" in the institution's pictures taken during visits. Finally, the signalectic system manual was prepared.

At the semester's end and with the projects concluded, the students made their final delivery and present orally the results they obtained, explain the processes they followed and the outcome of their research, contributions as well as the learning gained[10]. They were allowed to use digital presentations (videos or animations). ASE final presentation is held in diverse auditoriums of the university and it is the opportunity for the examiners integrating the board to make the student final evaluation[11] to value their competences and skills and feed back some commentaries and remarks to them. Through these observations and qualifications, the winning proposals are selected, two of each one of the four teams formed, being those best valued by the examiners and most satisfactorily complying with

[9] Some of the regulations that were studied and will be complied with in this project were: NOM 026 STPS 1998, NOM 003 SEGOB/2002, NOM 120 SSA1 1994 (Property and services. Hygiene and sanity practices in the process of food, soft drinks and alcoholic drinks) and NOM 001 STPS 1993 (Buildings, premises, installations and areas in working places – Safety and hygiene conditions).

[10] Each of the students teams working in this project shall summit: 1. Identity Design (logo) mounted on a rigid surface (panel) (GE). 2. Dummies of letter paper size A, business card, envelope, folder and invoice form. 3. Application of the identity system to three promotional materials (GE). 4. Signalectic system design. 5. Implementation or "sow", specifying production and location orders (to be included inside the manual). 6. Three prototypes (Trying to present of different systems. The self-supporting ones shall be done to scale). 7. Identity Manual and Signage Manual. 8. Complete quotation of the project production. 9. A compact disk with the following archives: (1) Identity Manual in PDF format. (2) Signalectic Manual (PDF). (3) Work methodology or process. (4) Working archives (vectors), including: logo, symbols, "sow", etc. (5) Archive of the digital presentation to the examiners.

[11] To this document ends, the "board" is defined as the inter disciplinary group of professors appointed to jointly evaluate the student at the course's end.

the appointed objectives.

Afterwards, the selected projects are presented to the client, who normally is represented by its top management. This is an enriching moment for the student, as they have to disclose their work in a professional manner and to a real client, who usually participates in a very generous way with his commentaries and observations regarding the project.

SELECTED PROJECTS

Mexican Confederation of Organizations in Favor of Intellectually Disabled People, A.C.

The winner team was the one formed by Alonso Sierra, José Luis Sánchez and Pablo Castellanos with its signalectic proposal base on the TEACCH (*Treatment and Education of Autistic and related Communication Handicapped Children*) system, method used in the creation of posters and labels formed by visual keys, which must be clear and definite so the specific person to which it is addressed can understand what it is intended to communicate him or else, he can pass what it is meant along to others.
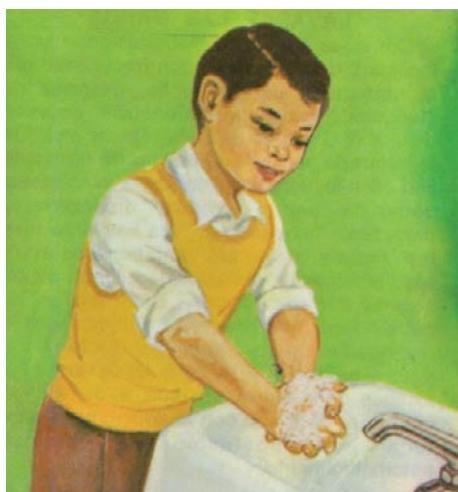
The signalectic system followed the concepts recommended by the TEACCH system. For example, the signs were located in accessible places, providing a quick impact, pictograms clearly differentiate among themselves and having the minimum possible abstraction. All effort were made in order to make it clear what action, image or object they represented.

Pictograms were designed according to the recommendations, objectives and educational techniques of the TEACCH system, carrying the iconography out with low abstraction, with the action and its description in the image proper. To differentiate each activity, either of a diverse type or realized over dissimilar materials, a distinctive color was selected.

LÁVATE LAS MANOS

TALLER DE PANADERÍA

2 RECOGE TU COMIDA

DENTISTA

EXTINTOR

Exceptional People, AC.

This project was designed by the students Mariana Cossío López and Carlos García Granados, who proposed the metaphor of a "man tree" to represent the corporative identity of Exceptional People, AC. They identified the concepts of inclusion, autonomy, respect and community to include them in this visual metaphor, by means of a graphic representation of medium abstraction. The IC symbol is located between the iconicity degrees of 3 and 5 in the Moles scale and in degree 4 in the Estivals scale, according to the theory of iconicity and schematization[12]. This means that its elements keep a relationship more logical than topological among them, for which reason it is necessary to insert the institution's name in order that its identity is interpreted in an adequate manner and in a global way. The signalectic system designed shows the "man tree" (taken from the corporative image of GE), whom is represented performing different actions to signalize them (this is the reason for its arms being longer than its trunk). The final measure of the basic GE symbol was obtained from the proxemic formula ($S = L^2/2000$), being the dimensions obtained of 24 cm x 24 cm. However, as the proposed use for this signage corresponded to a horizontal format, it was

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[12] Teoría de la iconicidad y esquematización: COSTA, J. (1998). *La esquemática. Visualizar la información.* Barcelona: Paidós Estéticas, 103-113.

dimensioned again according to the golden section, resulting its final magnitude of 44.7 cm x 24 cm.

The signs were fixed to the walls by means of magnets, so that it was easy to remove them in order to clean them.

Some of the conclusions set out by our pupils were: *"The challenge was to carry the "Aduana" cell out, explaining the processes performed in this area through the "man tree" character, because the client asked originally to use photographic images only. Retrospectively, it was advantageous that we*

realized the necessary research and could end up offering him a better option."
"The worst problem arising while we were developing our project was due to the printer, who combined our archives, impairing the quality of our project. We think that he was the first, but not the last printer that is going to give us this kind of problems. Anyway, it was something very good to learn for the future, as it depend on us to control and maintain the quality of our projects and take care and look forward to have a good and clear communication with our suppliers".

VASCONCELOS LIBRARY

The finalists for this project was the proposal of the students: María Perujo Lavín, Andrea Salcedo Margain and Laura B. Turrent Carriles, with the following characteristics: The pictographic and typographic signage carry indications in Braille alphabet in it, for the users with impaired vision, which is one of the main objectives of the design. Additionally, a system of tactopodal guidance was proposed to make more functional the Braille signalectics (the proposal complies with the standards and measures established in the ADA system).

Pictograms of medium abstraction were created for each one of the lounges, with reference to the characteristic shapes of the imagotype. The iconicity degree used is between 4 and 5 in the Moles scale.

The color selected were: black for pictograms and typography, so as to obtain good contrast over the gray of the aluminum, blue for the marks of pictographic informative signs , red for the prohibitive ones and green for the directional ones (in accordance with NOM ⁄ 026).

It is proposed that the symbols be printed on *dibond*[13] 3 mm thick in order to get a better quality, endurance and visual unity. As one of the main limits imposed is not to damage the installations, it is proposed that the signs be attached to the walls with a transparent glue, plus self supporting movable signage for directories and nylon for pennons to identify zones A, B and C.

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[13] This material is constituted by sheets 1.22 x 2.44 m, formed by a core of foamed PVC, 2 mm thick, covered on each side by an aluminum sheet, 12 mils in thickness, with different textures and finishes.
Information obtained in http://www.disaplastic.com.mx/prod7a.html consulted on October, 18, 2011.
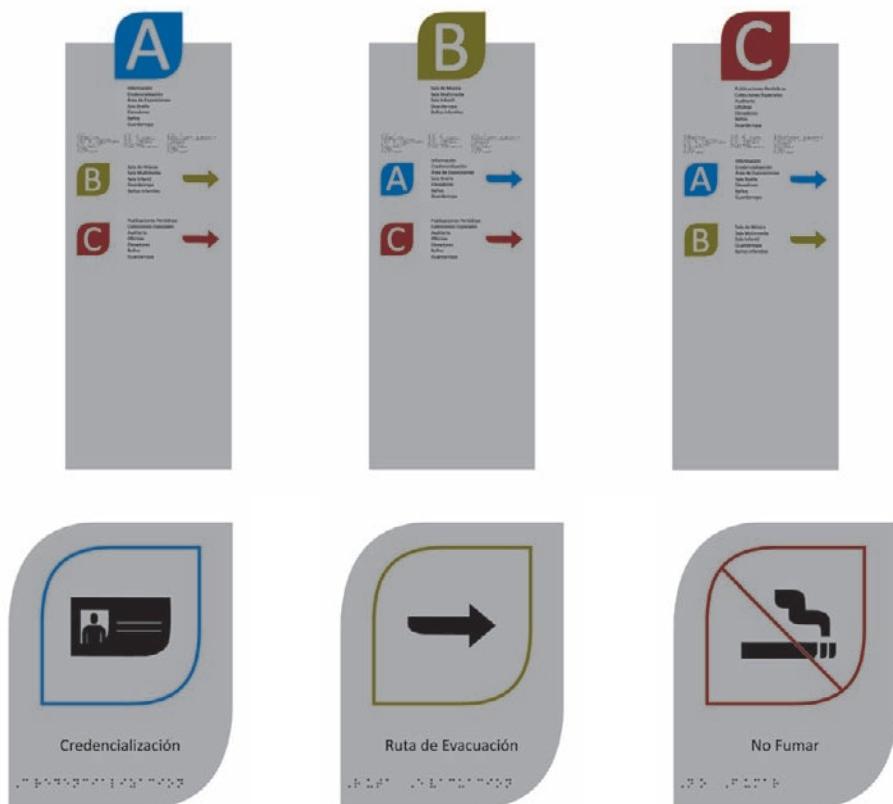
In what follows, we will mention some of the conclusions at which these pupils arrived:
"The project was particularly interesting for us as this was the first opportunity that we have had to realize a signalectic design addressed as much to normovisual users as to people with impaired vision. We had to make some research on the theme and get a first hand knowledge of the form in which people with impaired vision interact with the signs world.
We had to confront a number of defies, for example, the first prerequisite we had to comply with was to avoid generating "visual noise" in the library but be capable of attract attention.
Finally, once concluded the design in accordance with the requirements and concepts stipulated, to get a reliable printer (regarding his punctuality, honesty and the quality of his work). It was a difficult task, but everything came well in the end.

CONCLUSIONS

According to this teaching – learning experience, we can conclude that work performed in this type of projects induces the students *to reflect on how their proposals evolved, what were the results they obtained and the form in which they arrived to them, as well as how they could present them by means of solid arguments,* produces a more durable learning, which heightens the

future designers vision, secures the experience of working directly with a client for them and produces participative and users centered designs. Specifically, the projects we have described here, permitted our students to participate in the world of inclusive design focused on disabled people. The design results generated by means of PV appear to be more adequate to persons and their contexts and favor more creative responses from the students, as their work proceeds in a more free and flexible way.

We have noticed that the requirement of a "professional presentation" for these projects is assumed by students in a most serious manner. The teachers usually support the planning and organization of the project suggested by the students. Besides, they get involved in direct interaction with suppliers in budget analysis, schedule follow-up, materials and resources management and the solution of problems originated in this interplay. Another advantage of these projects is that the proposals regarding materials, processes and costs are more realistic than in the case of a purely theoretical exercise, because the students are conscious that it is intended to carry the projects out.

And more so, they constitute an area of personal and professional growth, as "the work develops in a non static process, as frequently clients expectations change in the course of the project, a situation that is complex and continuously happens in professional life." So, students must face uncertainty because of a customer variable decisions or lack of seriousness of a supplier, which makes them consider their decisions in a position closer to what they will have to do in their professional life.

Some weaknesses and threats that must presently be dealt with in the academic environment are: to find an equilibrium between amount of work involved and time available to complete it, as the projects are some times too ambitious in comparison with the duration allowed to them in a semester (that really last from 6 to 8 weeks). Another one, susceptible to be converted in strength, is the evaluation system applicable to this type of project "that must be done from the perspective of those involved in the project (the designer, the client and the users), which implies for the student to carry a complex synthesis out, as the expectations of each of them are frequently different". Then, we here propose to establish an specific evaluation rubric for each PV linked project, with the intervention of all the teachers involved in it and taking into account as elements to evaluate the student skills and abilities and also the project's precise specifications, the number of elements to deliver, the methodological process and the expected product quality. This more systematized type of evaluation will permit, in our view, to judge not only the PV, but all the matters previous to ASE as well, which will provide precise data on what to stress and reinforce in them, integrating their syllabus in a way that allows to control their teaching. We consider that to have an evaluation rubric per linked project will allow a greater validation in the teaching dynamics and strategies (notwithstanding academic freedom), for example, in all related to accomplishment of the project's objectives, brief's follow up and achievement, schedule's fulfilling, number of designs to deliver and quality of them.

In addition of what have been said, we are convinced that PVs constitute an excellent educational strategy, favoring that students acquire knowledge and skills, besides of allowing them to apply and strengthen diverse professional competences. They also create different areas of opportunity and growth for the Design Department of the UIA. We believe that another strength of PVs is the compromise and linkage they set up among four groups of fundamental participants: the linked institution, the Social Service area, the Design Department (coordinator and professors) and students. It has also been noticed that students participate with great motivation and contribute great effort in this type of projects. A significant area of opportunity is the professional experience acquired by the students from the university with the direction and guide of their professors, independently of the existential and curricular value for the student.

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DESIGN TEACHING AND CULTURAL COMPANIES. LANGUAGES, TOOLS AND METHODS TOWARD A PROFITABLE INVOLVEMENT[1]

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The topic of this paper is to focus on the relationship between design teaching and the different kinds of cultural partners in the field of cultural design. In this context we mean the company as a cultural company. In fact cultural production is increasingly a lively area of intervention and of business.

We assume that it is very important to involve the real interlocutors in the process of design teaching, especially in the field of cultural design where the complexity of the system is an interesting pretext to create useful situations. Specifically we study the relationship between the design disciplines and the humanities sciences as a basis to know the methodologies to enable the contact and the synergies with the cultural institutions (museum, territory communities, etc.). In fact museums, associations, communities of the territories are mainly managed by profiles that come from the humanities.

The hypothesis is that design teaching programmes can be a necessary tool to put innovation in the cultural system (in the specific realities) and (symmetrically) the cultural partners are an important field of experimentation, but for this target it is necessary that design develops the tools and specific modality of dialogue.

Two different experiences of design teaching will be explained where the relationship between design and anthropology represents a model of collaboration.

The first one regards an intervention (in terms of strategic and exhibit design research) in the Anthropological Museum in Florence; the second one regards a cluster of interventions (in terms of strategic, communication and exhibit design research) about the cultural identity of the Italian Alpine area (partner involved: Regione Lombardia). In the latter case we worked mainly on immaterial cultural heritage (festivals, rituals, gestures, knowledge, etc.).

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[1] We specify that the author of parts 1.2.3 is Raffaella Trocchianesi and the author of parts 4.5.6 is Ilaria Guglielmetti.

••• Design and humanities, cultural design, anthropology, rituals,
creative ethnography document •••

1. DESIGN & CULTURAL ENTERPRISES: LOOKING FOR A DIALOGUE

Here we propose an interpretation of the relationship between design teaching and cultural enterprises, the last intended in a broad meaning. We assume that cultural production is an increasing reality and it is an important area of intervention for the culture market.

It is very important to involve real stakeholder in the design educational processes, especially in the cultural heritage field where the high complexity of the problem is an interesting platform for design experimentation and practice.

Here we intend by *cultural enterprises* three kinds of stakeholders/players.

The first kind concerns enterprises that have invested in a line of work "art and culture oriented". These companies, due to their promotional or marketing purposes and their ability to weave the commodity production with the cultural one, include among their cultural actions, temporary initiatives (events, competitions, participation in festivals, etc.) and permanent activities (production of experimental products lines, magazines, the involvement of testimonials/artists who reinterpret products or limited editions, etc.).

For example, we look at the brand Absolut Vodka that has edited his famous cards with the picture of the product "dressed" in endless variations (and reinterpretations by famous authors) and has worked on the concept of "urban artistic wallpaper".

Another example is the fashion firm Etro that involved Alessandro Mendini in the *Mendini Dress* project and collaborated with the Teatro alla Scala of Milan and Vogue Italia for the costumes. Adidas is also extremely active in the field of unconventional contemporary art; for example on the occasion of its sixtieth anniversary, the company organized the event *Metallic Doors* involving a team of street artists who interpreted the brand, painting on 18 rolling shutters in the Porta Ticinese area (in Milan).

Or again the brand Mini is very active in the new media field (also with the aim to engage a younger audience): minispace.com is a meeting place for creative young people, sharing projects, and events. Moreover, this company was at the Biennale di Architettura (in Venice) with the event MiniSpace and periodically presents design competitions, also in collaboration with the Triennale di Milano, as well as organize video art initiatives. Another exemplary case is that of Illy Caffè company with her several activities in the field of art, the involvement of important photographers, the art&project magazine *Illywords*, the production of coffee cups and related products *Art Collection*, the collaboration with schools of creative writing. In the international context these are some evidence of the presence of companies moving toward art as an experimental field of communication, valorisation and production of value. Design, and design teaching, has to activate a connection with these situations shaping shared processes.

The second type focuses on institutions as museums, foundations and cultural centres. In

the last years an extensive literature and a strategic synergy between architectural planning, service and communication design, are evidence of the *museum-brand*'s presence. This kind of museum exists not only as a cultural landmark and place for the conservation and fruition of cultural goods but also as an "antenna" and a distinctive feature that impose itself like a proper cultural company (not from the point of view of management but from the one of communication and services).

We will deepen this second kind through a case study documenting the *exhibit and communication project for the Museum of Natural History, Anthropology and Ethnology section of the University of Florence.*

Finally the third type includes the government (public administrations) who have collaborated with companies, associations and foundations engaged in the culture field.

Also in this case there will be a deepening through a case study that explains the project E.CH.I. - Italo Swiss Ethnographies for the valorisation of the immaterial heritage in the border area.

In this paper we will focus on the innovation process design driven through tools, languages and methods for the valorisation of cultural heritage. These cases have been developed in complex contexts where the interdisciplinary component is fundamental. In these cases we recognize the value added by design in terms of tangible and intangible value and fruition.

2. DESIGN & HUMANITIES. NEW FORMS OF SINERGY FOR INNOVATION

The relationship between the design culture and the human sciences is the central topic both for the evolution of the designer's education and for the development of the design practice.

The teaching of meta-design at Politecnico di Milano, in the Design courses, provides a phase devoted to the analysis of the reality through the interpretive filters. These filters presuppose a choice of project and affect the project development. In the construction of innovative scenarios is important an interdisciplinary approach where Humanities attend both to build and to debate the socio-scientific context, and to shape the envisioning phase where we can see new contexts of use, new profiles of users, new behaviours and, above all, new design implications. The Humanities contributes to enrich the definition of the sociologic, anthropologic and psychological landscape, needed to elaborate and to tell about innovation. In this context we will focus on the interdisciplinary exchange between design and anthropology, and on their symmetric contamination.

In a experimental didactics oriented to design and process innovation, we move from knowledge as "re-production" to knowledge as "innovation" through:
• an apparently forced *dislocation* of design in other disciplinary areas;
• the *reinterpretation* of the methodological tools borrowed from other disciplines and transferred into design process (in the analysis and application phases);

• the s*pecific contributions* of "hetero"-disciplinary competences.

This approach is confirmed by cultural anthropology in which the aesthetics is defined as an inter-cultural category (of the knowledge). Art, anthropology and design are places of discussion, understanding and evaluating of the cultural activity (Caoci, 2008).

Both anthropology and the discipline of design look at the human behaviours: anthropology studies the *features* and the "*portraits*" of the people through the metaphor of *collection* with the goal to watch for understanding, while the discipline of design studies *uses* and *methods of fruition* through the metaphor of repertoire, *target of users* with the goal of *watch for innovating*.

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         FEATURES & PORTRAITS                    USES & FRUITIONS

ANTHROPOLOGY              → BEHAVIOURS ←                    DESIGN

WATCHING FOR UNDERSTANDING                 WATCHING FOR INNOVATING
COLLECTION                                             REPERTORY
"PORTRAIT"                                            USER PROFIL


         THE NEW APPROACHES DESIGN ORIENTED TO INTERVENTION ON REALITY
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FIG. 1. RELATIONSHIP AND "SYMMETRIES" BETWEEN THE ANTHROPOLOGICAL APPROACH AND DESIGN APPROACH (RAFFAELLA TROCCHIANESI)

The "catalogue of the portraits" *www.exactitudes.com* by the photographer Ari Versluis and the profiler Ellie Uyttenbroek is an interesting example about the hybridization of these disciplinary areas: it reflects the analytic vocation of anthropology and the scenarios vocation of design.

These artists work about the recurrences of the stylistic codes (clothing, accessories, attitudes) identifiable in the individuals that live in the same urban environment. They portrait people (as they have been intercepted in the city) in a neutral set, in the same position and attitude. In this way the artists create some groups representing a tribe that they underline with slogans and definitions exemplifying tendencies and styles. This project (in progress) concerns several cities in the world making a creative photograph of a multifaceted population. This catalogue is an interesting observatory for anthropologists, an useful tool of work for the designer and also an example of approach to observation through technical, design, psychological and social competences.
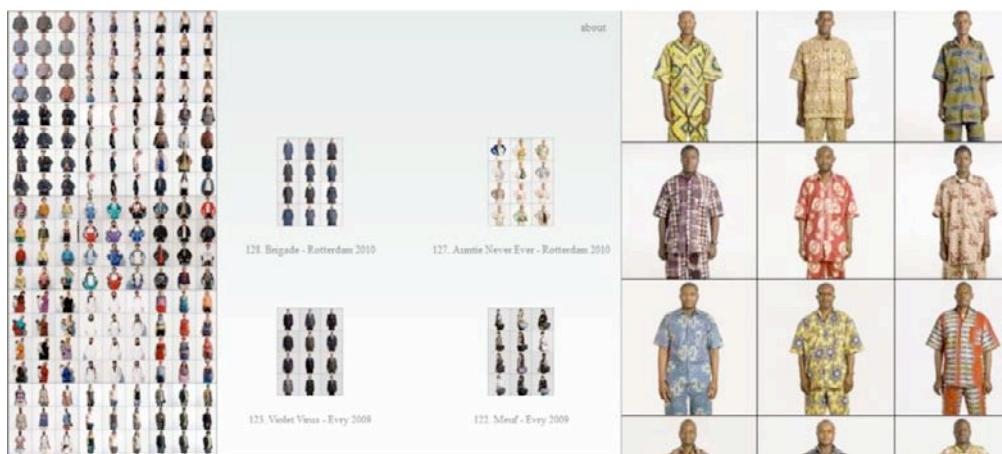
FIG. 2. PAGES-COLLAGE RETRIEVED FROM THE WEBSITE WWW.EXACTITUDES.COM (A. VERSLUIS, E. UYTTENBROEK).

3. CASE HISTORY. PORTRAITS OF PEAPLE THROUGH OBJECTS: NATURAL HISTORY MUSEUM, UNIVERSITY OF FLORENCE, SECTION OF ANTHROPOLOGY AND ETHNOLOGY

We believe interesting to describe an experience of thesis of degree in Interior Design focus on the exhibit design of Natural History Museum, University of Florence, section of Anthropology and Ethnology (Supervisor: Raffaella Trocchianesi, Assistant supervisor: Giulia Pils, students: Benedetto Di Luzio, Nicole Mattei). An important part of this work focus on the research and knowledge of he collection and the brief's building through the synergistic collaboration with the curator.

We talk about a museum that have a rich and sophisticade collection of objects, clothes, documents with an significant ritual mean. These old collections include rare exemples of artifacts built by caribbean popolation that came in Florence in Sixteenth century. In fact the Medici family collected amazing objects from the New World ghatering them in the *wunderkammer* at Pitti Palaces and Uffizi. These collections includes also several objects taken from the earliest explorations of the Pacific Islands made by James Cook, the Captain of the British Navy and the other taken from African area (between Sudan and Congo) collected by the explorer Carlo Piaggia. In the 1869 was established the National Museum of Anthropology and Ethnology by Paolo Mantegazza, professor of the first course of Anthropology in the University. So the first core of ethnographic collections passed to Museum of Anthropology and Ethnology. Since 1922 the museum is home to the Nonfinito Palace. Following the other collections where added to the heritage of Museum through travels and scientific expeditions by Mantegazza and his successors until the middle of the Twentieth century.

So we understand the complexity of cultural heritage system: from the historical palace to the collections of the objects and to the immaterial value of the ritual and symbolic mean of the objects. This assumes an inevitable dialogue (to understand and to share) between

the curator and designer to emphasize the richness of means and the collection's beauty.
We can consider this case study as a collaboration's model between school and cultural company and between Humanities and Design.

This relationship was very important in every phase of the project: in the first one to learn the order of this large collection, to understand the codes, the means but also the narrative potential; in the second one to set up the analysis ensuring scientific coordinates consistent with the collection and to define the project's brief and the new profile of visitor; finally in the last phase (exhibit and communication design) to verify the model of fruition and narration of contents.

This collection is an opportunity to talk about the human cultural and biological differences; the museum approach is naturalistic but the concept is oriented to a "multileyer" model to communicate a very large cultural and geographical landscape. We think for a wide audience (not only expert profile). The projectual metaphor is the *time machine*: to put some "technological and temporal window" to multiply the possibility of reading levels creating parallels between past and present. We have a patrimony 10.000 objects that explains the uses and the traditions of these peoples, each of these would need equipment to include a rich iconography.

Below we quote some tools specially built for this museum usefull to understand the identity of the collection and also to give some projectual suggestions. These tools are matter of dialogue with the curator.
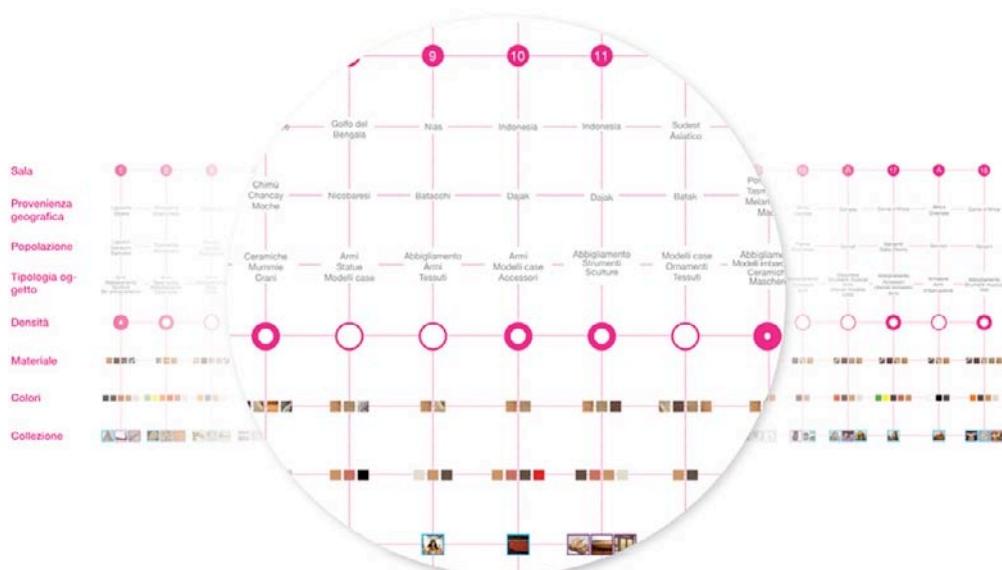

FIG. 3. COLLECTION'S ANALYSIS: THE *ANALYTICAL STORYBOARD* (B. DI LUZIO, N. MATTEI, G. PILS, R. TROCCHIANESI).

An *analytical storyboard* (color and material map included) highlights the several levels of the identity's heritage (also in relation with the scientific order): kind of the object, object, color, material, geographic origin, quantity and so on. This synoptic reading has analytical purposes but highlights recurrences, issues or "anomalies" through a critical syntesis usefull to set up the process of the project.

We also elaborate several cards with the clusters of objects in every room (sometime "main objects"). In our project not only the exhibition of the objects but also the relationship between them is very important.

We create also a projectual storyboard, a kind of *exhibition score* that highlights the different levels of fruition: from the systematization of the objects to the new technologies insertion, until the time of permanence in every room and finally the actions of use.
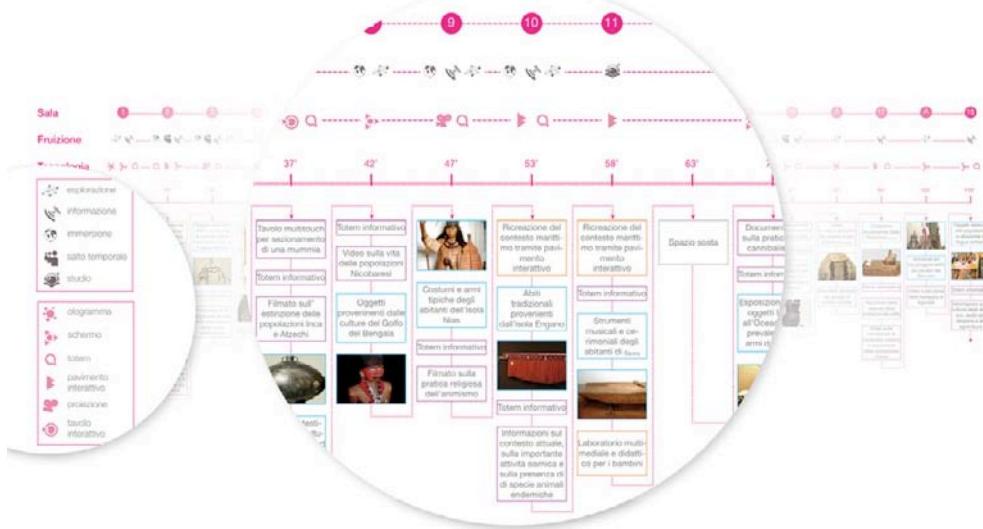
FIG. 4. SET UP OF WAY OF THE VISIT: THE *PROJECTUAL STORYBOARD* (B. DI LUZIO, N. MATTEI, G. PILS, R. TROCCHIANESI).

To put the new techonologies in the visit way permits to work about the plurality of informations. Particularly the new exhibition artifacts contain the collection (ensuring good light and good conditions of environment) while the historical showcases already in use in the museum contain multimedia devices.
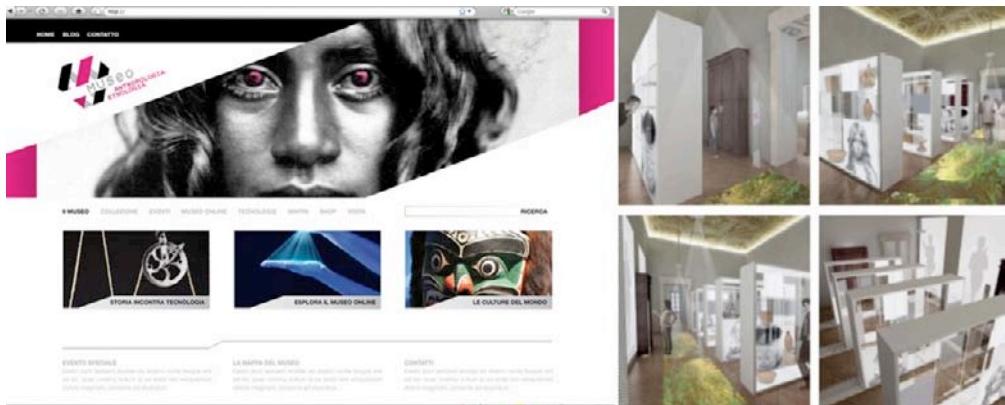
FIG. 5. SOME PICTURES OF THE HE PROJECT (B. DI LUZIO, N. MATTEI, G. PILS, R. TROCCHIANESI).

This experience, where the teaching dimension compares with a cultural enterprise museum, presents methodologically and strategically several interesting features. The relationship between Design and Humanities becomes an important platform of projectual experimentation[2].

4. PUBLIC ADMINISTRATION POLICIES AND ACTIVITIES OF CULTURAL INDUSTRY

Public Administrations, in the last ten years, have started a process of transformation related to the reform of the "Welfare State" has created new relationships between public and private in the protection and development of culture.

In many, in recent time, have shown that the general shift of policy towards the institutional activities of regional and local authorities – in all the various forms of community inovolvement – represents an adptive response of Public Administration (central and local) *in front of the restriction of available economic resources and the need to better articulate the production and promotion of "cultura"* (Hinna, 2004).

The "recipes" for the proposed creation of a new culture of *public-private governance* are numerous, and in the political debate, it makes greater use of terms as "pluralism", "competitive", " manager management" (Hinna., 2004) but also strategy design, "design driven", to confirm a recognition of the discipline in the redefinition of *governance*.

Within this vast field of investigation, it was decided to investigate the relationship between the cultural policies of Public Administration, craft and cultural industry. This central theme also of the first global forum dedicated to the cultural industry, organized by UNESCO[3], which has focused in particular on craft, design and fashion. Essential-

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[2] Thanks to Monica Zavattaro, Curator of the Musem.
[3] Forum UNESCO "Creativity, innovation and eccellence: from the handicraft to the companies of the design and fashion". This event was hekd in Italy – 24.26 septembre 2010– Villa Reale, Monza, with delegates of the delegates of the 192 members-countries Unesco, and also with other important peolpe of the industrial and economic field.

prerequisite for this connection is that the culture as a constitutive element of a given community and sphere of production of specific meanings of identity, is strengthened as a result of globalization. More than any industrial processing, the process of cultural production is, by its nature, an expression of a specific historical and geographical context.

For this reason, the cases listed all express the profound relationship with the cultural elements within the vast territory of the intangible cultural heritage, in which the craft (as well as rituals, performances of oral culture, arts and entertainment) as indicated in the UNESCO guidelines, is the expression of known techniques, repertories, "transfer mode" (workshop, master…) and evolutionary processes frequently oriented design.

If you look at the traditional crafts sector in recent years there has been a progressive weakening of the role of institution in promoting craft training highly qualified and its valorisation. What's going on rather than in Germany or Great Britain but especially in India where the government ha invested heavily in the development of "typical artistic craftsmanship", rather than a network of organizations in support of communities and their traditions, today attractive elements high-impact tourism and economic development.

Exemplary in Italy, in this direction, the organization I.S.O.L.A. (Istituto Sardo Organizzazione Lavoro Artigianale), a organization set up by Sardegna in 1957, whose primary purpose was to promote local and regional crafts (inn national and international level), encouraging, proting and disseminating the culture and products of Sardegna. The I.S.O.L.A participated in "La Triennale Milano", always enjoyed the support of magazines such as Domus, designers and critics, introduced the first "brand of origin and quality typical, favored the aesthetic innovation, has several exhibition areas and especially collaborations wove with market participants. A virtuous example, abolished in the budget of 2006 which no longer support the organization, leaving no heirs a location for synergy between public administration and social community.

Recently, thanks to the italian rectification (2007) of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (Paris, May 17, 2003), are spreading initiatives in support of artisan culture both in terms of creative partnerships with industry to facilitate the training processes.

Is the case of the Province of Rome who is trying to encourage the greatest possible synergies between tourism, trade and job opportunities. The Province of Rome, since 2004, argues companies and individual craftsmen in the exploitation of their creations, through calls annually that have had the initial result of the enrichment of the list of new artisans to expand the market sectors in which the 'List of Artistic craftsmen" (craftspeople who have gained the Quality Mark, recorded in February 2010), is structured. The craftsmen who get the mark can join the project "The Arts and Crafts Museum Merchandising," if their production is suitable for sale in the bookshops of museums participating in the initiative. Specifically, the province is also working on a number of priorities: 1. Relaunch of the brand of Artistic Handicraft in the Province of Rome 2. Definition of interactive tools for

driving 3. Analysis of the craft areas. With the recent announcement made in collabora-tion with the Academy of Fine Arts in Rome, *"Arts and crafts and creative artistic expertise - vocational experience as a strategic tool to stimulate employment in micro-businesses"*, the craft is measured his chances of being a useful range employment.

In Tuscany we have developed scenarios valorization in crafts and new technologies, in-volving professionals engaged in the application of technologies for the cultural system. One example is the Tuscan Collection, a web portal that was created in 2008 with the goal to introduce and promote the artistic and traditional heritage of Tuscany, an online tool through clear, simple in the consultation, complete the information and able to offer the most extensive research opportunities.

In parallel, the portal allows companies Tuscan sector have a quality instrument in which to present themselves and their peculiarities of processing, as well as a significant selection of their products. The online catalog is designed for professionals in the sector but also the general public. For each of these were also made available some of the most advanced tools of geographic location (GoogleMap or other). Tuscan Collection has emerged as a kind of "virtual showcase" productions of Tuscany: the online catalog, as well as offering am-ple opportunities for research on corporate data and characteristics of products, enabling member companies to integrate and update the information entered, providing a dynamic picture of reality Tuscan artisan production.

5. CASE HISTORY. CULTURAL IDENTITY OF THE TERRITORY THROUGH PERFORMANCE AND RITUALS.

PORTRAIT ITALIAN ALPINE

The project E.CH.I.

The following Case Histories action of field research conducted by the Public Adminis-tration, leader of the wider "E.CH.I. *Etnografie italo-svizzere per la valorizzazione del pat-rimonio immateriale dell'area transfrontaliera"*, becomes "act declared" for the realization of a process of co-design starting from the identification of elements of identity of the Alpine region has allowed the organization of the "Interior Design Laboratory" for first year stu-dents at the Polytechnic of Milan, School of Design, AA 2011-2012.

It was thus implemented (the experience is still in progress) an ambitious model of dia-logue between Public Administration and the Faculty of Design at the Politecnico of Milan, aimed to the verification of models, tools and results that have repercussions also in Teaching Design, as well as cultural policies in the public administration itself.

The "Lombardy", by the Archives of Ethnography and Social History (AESS), is the project leader from January 2010 of "E.CH.I. - *Etnografie italo-svizzere per la valorizzazione del patrimonio immateriale dell'area transfrontaliera* ". The project takes into account the Alps, hinge of Europe, an area that is home to people from very different history, language, economy, legal organization, and membership administration. Despite the differences, all

these people share the conviction be part of one great family united by the powerful cement which is sometimes called "alpinità". Different communities have preserved to this day a large part of their cultural heritage of each.

Languages and dialects, sedimentation unique language, that can not play, fantastic stories with deep roots; legends that explain obsolete customs, landscapes built by human work and ancient place names, songs and music, dance rhythms of uncertain origin; knowledge and beliefs transmitted by technology and science, always renewable ritual repeated a thousand times to solemnize the day of almanacs.

The purpose to explore this universe little known, public institutions of the regions that share the border territories of the Central Alps (Valle d'Aosta, Cantone Vallese, Piemonte, Canton Ticino, Lombardia, Sud Tirolo e Cantone Grigioni), have combined expertise , means and experience to realize the E.CH.I. project.

A team of Design & Humanities skills for project management
The nature of intangible heritage has elements of "mobility" in which to verify and "activate" with design-driven tools, the potential for "innovation" of these cultural heritage. This is in short the commitment that the design is declaring and demonstrating in the course of recent research conducted within del'UdR Dech (ref. Project "Contemporary Authentic Milan", Head E. Lupo, INDACO Department, Polytechnic of Milan) . Such investigations can not help close relationship with the humanities (especially anthropology) in its various forms, in a logic of shared work that well demonstrates the intense bond between Design and Humanities.

Just what is occurring in the project E.CH.I., where a team of diverse skills can create an extensive degree of interdisciplinarity. The working group creates a "flow of semifinished" flexible which build the project process and strongly determines the final results. These include creative new media, video makers, photographers, designers and experts in humanities disciplines as anthropologists, ethno-musicologists, ethnologists and historians who are involved in different phases and to produce distinct outputs. This internal working methodology, is in line with the approach based on Design Thinking that provides continuous release of "prototypes" to share with the communities themselves to the implementation choices you want to adopt. But above all strongly oriented experience of Training Workshop On "How to document the technical knowledge and practice traditional crafts. The case of *Pizzo di Cantù*".

This action (which corresponds to the WP. 2 "Exchange of experiences and Methods") has made clear a way of working than going to the relationship between local reality and research activities. The interaction with the community has resulted in deepening of topics of interest to the inhabitants of the territories involved in the restitution eanche quickly (one week) of authorial vision, creative interpretation of the result of ethnographic document proposed by each participant.

The active training workshop, from ethnography document to creative document

Cantù, but also Carimate Novedrate, Figino, Mariano, Cucciago and other countries tell of a diffuse knowledge in the area of Brianza (MB province): the processing of bobbin lace. This ancient craft technique is also evidence of a persistent vitality in the young genera- tions, as evidenced, in particular, the opening of numerous schools on the territory of lace Cantù. These courses, for almost all freely organized associations arose at local, are taught by *merlettaie* who teachers and keep alive the technical knowledge gained in centuries of activity on the territory.

Of the steps of work that subsequently has allowed the construction of the workshop from different skills involved.

Phase 1. Identification of practical craftsmanship "typical" and the sensitive areas of in- vestigation.

The intangible cultural heritage is characterized by a "quality knowledge" as a whole determines a sort of coefficient of "vitality and potential" in the contemporary. The iden- tification of this quality has been paid in part by internal staff to AESS (specifically , the anthropologist Fabia Apolito), through a strong relationship with the community has launched a brief report on the community aspects, the specific character of the technique, the system transmission, the repertoire and finally the collection of promoted actions. This report has allowed a first classification and identification of areas of investigation on which to work the trainees. The result of the anthropological report, which had no purpose ex- haustive, is a list of possible "witnesses", organized by schools, factories / cooperatives, teachers. This structure, with more twenty interlocutors agreed, was the network on which they are organized site inspections.

Phase 2. Identification of expert and tutors team.

The first day of the workshop was devoted to the knowledge of "*Pizzo di Cantù*" through the testimony of members of the community. Professionals such as the historic *Maria Luisa Rizzini*, the expert in economics and tourism *Manuela Scarnicci* and representatives of the institutions including the Mayor of Cantù *Tiziana Sla* and Vice Mayor of Novedrate, sponsor of the Biennial Novedrate, *Serafino Grasso*. Entities that contribute in different ways to the continuity of the practice, his investigation in different fields of knowledge and above all build that system of diverse interests is essential to promote innovation. This phase of research and contact with the network of "experts" was conducted by the staff of AESS, each pointing to their own contacts, consistent with their skills. The definition of a group of witnesses "experts" can determine the results of field research, a large unexpected stimuli, and indicates lines of research. For example, the ongoing work on the organiza- tion of the Biennale of Cantù and especially commissioned for the construction of a single lace, headed by designer *Alessandro Mendini*, has opened a research field closely related to the design, curated by *Ilaria Guglielmetti*.

Phase 3. Identification of the team of tutors.

The selection and coordination of tutors is the phase that best demonstrates the presence of the humanities with those closely related to visual design.

It consists of a group of different experts in order to facilitate the obtaining of documents, video, audio and photography.

Guido Bertolotti

Ethnographer, an expert in connection with the informant and the conduction of the interview as "empathic time" delicate and exhaustive collection of information on the determinants and the consequent formulation of the research report.

Rossella Schillaci and Elisa Piria

Visual anthropology and ethnomusicology, the two have dealt with the professional support to interns video makers, both in technical choices in post production.

Mario Cresci

Photographer and Visual Designer, Cresci is a professor at the Brera Academy of "Photography: document, communication, art" in the post-graduate courses, as well as lecturer and visiting professor at many other Italian and international school. The reputation and experience of M. Cresci is established around the theme of the force of anthropology and cultural heredity, in the construction of the image, suggesting an 'idea of ethnographic document that has the power to become the communications "other" and sometimes "work of art itself". The involvement of a photographer with this vocation has allowed us to orient the work of photographers as well as video maker, in the author's product direction, with a strong personal vision that assumed a process of selection of material, often difficult to run.

Phase 4. The fieldwork.

The fieldwork was carried out in two days, organized into 4 groups, each consisting of an anthropologist, a video maker, a photographer and an expert audio interview, followed by a tutor. Each group has conducted approximately 6 visits one of the following 3 areas identified: manufacturing, schools, lace makers. These areas will be added to the focus of the work dedicated to the vision of the designer A. Mendini.

Phase 5. The collection of results.

After the fieldwork and the subsequent post production are reviewed, with the presence of the whole community and institutional representatives interviewed, the results obtained. All in all ethnographic documents demonstrate a creative tension that brings up a personal look, which indicates a subjective development of communication and innovation are otherwise imperceptible. The interest of artifacts reside in the ability to record and "emphasize" aspects of the intangible asset on which the actors themselves are not always aware, and demonstrates the importance of involving the culture of the project in its various forms such as visual design, also in the early stages of research and not only in the final stages of development, as commonly happens. In this case, although still in a complete, consolidated the role of a Public Archive of Ethnography observes behavior that has extended, involving the design and its ability to "build visions".

FIG. 6. PHOTO CLICK PAGINATED ON MOLESKIN FORMAT, BY MICHELA PANDOLFI (PIZZO DI CANTÙ, OCTOBER 2011).

Ethnographic document (creative) versus design teaching

From this learning experience conducted by the Public Administration, with the presence of especially young creative visual design, has developed an opportunity for Design Teaching from research in the field testing of a port to the Interior Design workshop entitled "Portrait Italian Alpine Laboratory ". The ethnographic data, collected in the inventory E.CH.I. dedicated to cataloging and the vision of all artifacts audio-video-infographics products, becomes part of a collection of "objects". This collection of objects chosen by the teachers, according to criteria of representativeness of the word "*alpinità*", it becomes not only collection but also "repertoires" of reality that indicate significant rites, technical knowledge, stories, ways of "doing" but also to stimulate visions "other" students are guided to see. Will be provided five scenarios in which students exercise curatorial skills and preparation, starting from the interpretation that will make the "ethnographic objects" provided. In this way field research ferries versus other outcomes where innovation is expressed in the mode of exposure / use of ethnographic documents, opening gashes of territorial identities that we wanted to call "Portrait Italian Alpine". The workshop will be conducted by Prof. Raffaella Trocchianesi and Prof. Ilaria Guglielmetti.

FIG. 7. PHOTO PROCESSING, DI ILARIA GUGLIELMETTI (PIZZO DI CANTÙ, OCTOBER 2011).

6. CONCLUSIONS

The reflections and case studies collected in the paper, show a diverse system of relations Design & Humanities, as the basis for both formative processes of valorization of cultural identities. If part of the cultural enterprise is seeing a complex interweaving of production (temporary events, branding strategies…) with cultural production, public administration there is a sort of "carry compact" closely related to political governance guidelines dictated by institutional organs, primarily the UNESCO. In such logic is not always the role of design is explicit and its impact on the weak area and the opportunities for training follows traditional processes.

In both cases the size of educational-training study presents interesting characters rather different from the methodological point of view is that strategy. If the *exhibit and communication project for the Museum of Natural History, Anthropology and Ethnology section of the University of Florence*, has established a link between heavy curator and designers in order to bring out the richness of meaning and the beauty of the collection, enabling new forms fruitive. This is also why this project can be read as one of the possible models of collaboration between schools and cultural enterprise and between Humanities and Design. As part of the Public Administration the Case History *E.CH.I.*, for now it remains an isolated instance in which the ethnographic documents "creative" does not only contribute to building an inventory but are used as "sensitive cultural content" for a experience of "design teaching and cultural companies".

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EDUCATION/TRAINING AND PRODUCTION SYSTEMS. A REPORT ON FIFTY DESIGN ACTIVITIES - DSA, UNIVERSITY OF GENOA (2005-2011)

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This paper proposes a reflection on the relationships between the university and production systems based on the results analysis of 50 activities agreed by the DSA (Department for Architectural Science - University of Genoa) with companies, institutions and organizations in the period 2005/2011.

The paper is divided into three parts. In the first part, "Innovation and growth", the 50 conventions, the theoretical frameworks, the elements and criteria of the built dataset will be introduced, supported by the presentation of the most remarkable case studies. The second part, "Shaping data to bring out meanings", will show how a graphic visualization was drawn as a methodological tool of analysis and will underline the observations that it suggested and highlighted. The third part, "Collaborative models / contemporary roles for designers", will draw the conclusions, inducted by the work on the dataset, of the role of design and the needs for designer training.

••• Training design approach, design process, fringe design, star/shaped visualization •••

[1] Fagnoni R. author of the text: Innovation and growth.
[2] Puri G. author of the text: Shaping data to bring out meanings.
[3] Sabeto C. author of the text: Collaborative models – contemporary roles for designers.

INTRODUCTION

The dialogue and the interaction between the education system and the industry is a common practice, among design courses.

Thus in the research on design education, developing a programmatic analysis, hitherto neglected, on these collaborative activities, is a shared requirement.

Clustering the collected data can help to interpret the results and potentials of these collaborations to redefine the content and methods of design training.

The verification and the consciousness of the processes, involved in such collaborations, and their connections with the achieved outcomes is fundamental for the innovation in design education. It is necessary to understand and detect what the strong and the weak points, that characterize the collaborative experiences with companies and enterprises, are.

Creating a referential data set using qualitative indicators and parameters is useful to exemplify the role of design in the project, the training approach and the impact on the social fabric.

In order to analyse past experiences to plan for the future, this research makes use of proper design tools to accomplish our research task. We chose a "graphical"[4] approach that is very important in design activities and contemporary languages.

The purpose is to read the data and interpret the information that emerge from an elaborated info-graphic of the relationships between concepts, actions and processes.

It will be shown how the visualization of the soft clustering helped to identify three collaborative models and to outline an answer to the question: what are the roles of designers emerging from this scenario where the point at issue is the design strategic responsibility in changing processes?

INNOVATION AND GROWTH - THEORETICAL FRAMEWORK

The topic "design education" is directly connected to the growth both of the involved subjects, and of the cultural-territorial context.

In design teaching aiming at the match between design and economic system leads to empower the interaction between people, ideas, capital and culture, that is potential vehicle for innovation in products and processes.

Universities, with their scientific and educational production, collaborating with institutions and local businesses, may be the driving force of economic and cultural development. Furthermore, the collaboration between training system and productive-economic system

[4] G. William Balchin (1916-2007) English geographer, in 1972 published research on the use of maps and charts, which requires a particular skill (Graphicacy) the ability to decipher the image as a first reading mode and later interpretation. Balchin, G.V. & Coleman, A. M., (University College of Swansea / and King's College / London). (June 1966). Graphicacy should be the fourth ace in the pack, *Cartographica: The International Journal for Geographic Information and Geovisualization University of Toronto Press*, 3 (1), 23-28.

can offer the opportunity ⁄ for an entrepreneur, or an institution ⁄ to confront new ideas, new experiments, through the application of validated methods and processes, while, at the same time, it can be an occasion ⁄ for students and researchers ⁄ to respond to real needs, developing new knowledge.

A fertile relationship between universities and economic context can influence entrepre⁄ neurial attitudes, in an efficient system of interaction between people, professionals and businesses, organizations and institutions. Sharing ideas, knowledge, experiences, projects and technologies can encourage the growth of the territorial capital.

During the design process, experimentation is the moment when proficiency and aware⁄ ness are acquired. In this mechanism Interdisciplinarity plays a very important role, en⁄ hancing the interaction among people, working in different fields.

To go further, as Edgar Morin (2011) says, a step forward in the direction of transdiscipli⁄ narity is needed. This step is crucial to build a global vision, able to structure and combine different types of knowledge. "Understanding the interdependence of cultural systems and ideas is now more necessary than ever. This will help to change our way of thinking, giv⁄ ing us a tool to escape from the abyss into which the planet appears to be designed."

The starting point of our reflection was to understand where we are, to take stock of the situation developing a critical thinking on the overall situation of the experiences and the achieved results.

Which are and how are detectable the strengths and weaknesses that have characterized the educational experiences made through collaborations?

To answer this question it was necessary to analyse the data and create a referential dataset of the cluster. Each activity has its own story, made up of people, ideas, needs, outcomes, processes, errors and rewards. Each activity has its inevitable final verification, its assess⁄ ment and possible developments. Every research has its own important phase of observa⁄ tion. If You from outside examine how some actions take place, how to use objects and spaces, you can create the knowledge that comes from experience.

The work of cataloguing and drawing an overall assessment on 50 different conventions that the DSA carried out between 2005 and 2011, as well as documenting the objective and quantitative data, has also started a rethinking of each activity by retracing and evalu⁄ ating the steps of the process, providing an opportunity to an extensive qualitative reflec⁄ tion about the education system.

FIG. 1. ANALYSIS OF 50 ACTIVITIES THAT THE DSA CARRIED OUT BETWEEN 2005 AND 2011.

Mapping Method

The adopted method to map the 50 activities saw a first phase when the assets were catalogued by client, by period, by responsible, by scientific groups involved (students, PhD students).

A second fundamental phase has been the selection and definition of the analysis parameters and the creation of a data framework that provided a system to read the data and drive the research.

Afterwords a graphic visualization was elaborated. It permitted to simultaneousely read and confront the 50 conventions, passing from a descriptive analysis of the data to a multivariate analysis that allowed an interpretation and evaluation of the emerged relations (among actions and processes).

Quantitative parameters

The examined activities involve the following percentage in the business environment: 42% of Small and Medium Enterprises, 36% of Public Administrations, Institutions and Organizations, 22% of Large Companies or Industrial Groups[3].

The total amount funded to the Department, against the 50 activities, amounted to about EUR 1,450,000.00.

[3] Small/Medium enterprises: Martini Illuminazione, Malvestio, Confalonieri Con&Con, Trivellato, Gruppo Boero, Leithner, Ariete, NewCom, MonettiMelform, CoRePla, Azimut Benetti, Razeto&Casareto, Pininfarina, GiglioBagnara, Boero Bartolomeo, Maspi, Noberasco, Moving srl, BRC spa, Ta∕toh srl. Public Administrations, Institutions and Organizations: Camera di Commercio di Genova, Miur Prin, Prai Fesr Fondo Sociale Europeo, associazione Culturale Attese Biennale Ceramica, Ucflor Mercato dei Fiori Sanremo, opere Sociali di Misericordia di Savona, Diocesi di Savona, Direzione Amministrativa dell'Università di Genova, Commissario Delegato Prefettizio Provincia di Genova, Servizi Integrati Infrastrutture e Trasporti Regione Liguria, Lega Italiana Lotta ai Tumori, Comune di Novellara, Comune di Savona, Comune di Genova, Regione Toscana, Ucina, Infomobility. Large Companies or Industrial Group: OtoMelara, Iveco, FinMark, Carige, Lavazza, Ferrero, AnsaldoEnergia, Philips, AnsaldoBreda, Fincantieri.

Qualitative parameters

The first parameter taken into consideration concerns the starting point of each activity. What started the convention? Later, the results, the methods, the training approach, and the generated effects (aftereffects) were taken into consideration, following step by step the evolution of the process.

1_Starting point

Why, a company, an organization, or an institution has chosen to collaborate with the university?

To attract talent? For good ideas at a good price? To bind to a community? To increase the potential for "visionary" inside? The reasons that gave rise to each partnership are different and can be summarized as follows:

- Expectations towards the very product (material or immaterial) of the design activity
- Opportunity to have a collateral result, not necessarily a design product, an advantage, resulting from the relationship with a university (10%).
- Willingness to invest in knowledge, expectation from a participatory experience, often without a direct interest in the product (22%).

2_Results, i. e. outcomes emerged from the educational processes

The evaluation of the results has allowed to analyse, more concretely, the outcomes.

How many experience results were concepts? How many prototypes? How many products (tangible or intangible)? How many gave rise to an effective and documented implementation (verified at the end of the collaboration)? It must be taken into consideration that some of the experiences which led to a concept or a prototype gave products afterwards (for direct initiative of the companies).

In most cases, the results are products (60%), not necessarily only material, but also those achieved in respect to the initial task of the project. A series of activities ended with the development of concept (34%) and only in three cases (6%) prototypes were developed.

Ansaldo Breda is a representative example of how the results often evolve in succeeding moments.

The research started in 2009, it was developed from the need, expressed by the company, to present a new model of the Electro-train for regional and suburban transport, that had to be outfitted and set up for its launch foreseen for 2015.

The situation of the means of transport and the current service shows an evident uneasiness on behalf of the users and therefore the need to re-think not only the spaces but also a system of adequate fruition of the needs of the contemporary life, in which mobility, communication, relations, types of consumption have evolved without a correspondence with the typology of circulating means and services.

The topic was proposed in a laboratory product, in first year of the Bachelor course. At

the beginning of the project, through site visits in the company, a research brief, specific and structured on the requirements and systems from the engineering company was given to the students.

The students, in groups, developed different aspects of the survey on the target, on the needs and the materials.

They developed a series of proposals ⁄ in concept ⁄ for new ways of living and enjoying the trip. Following up this experience, positively valued both by the company, and from the point of view of the learning experience, Ansaldo Breda commissioned the development of a project to be set up on a structure already in production, carried out by a small group of young designers (PhD candidates). The implementation, held in parallel with the technical office of the company engineers, has allowed the continuous verification of the technical and functional, as well as formal solutions.

The project is now in its final phase and will shortly be engineered by the Engineering Company.
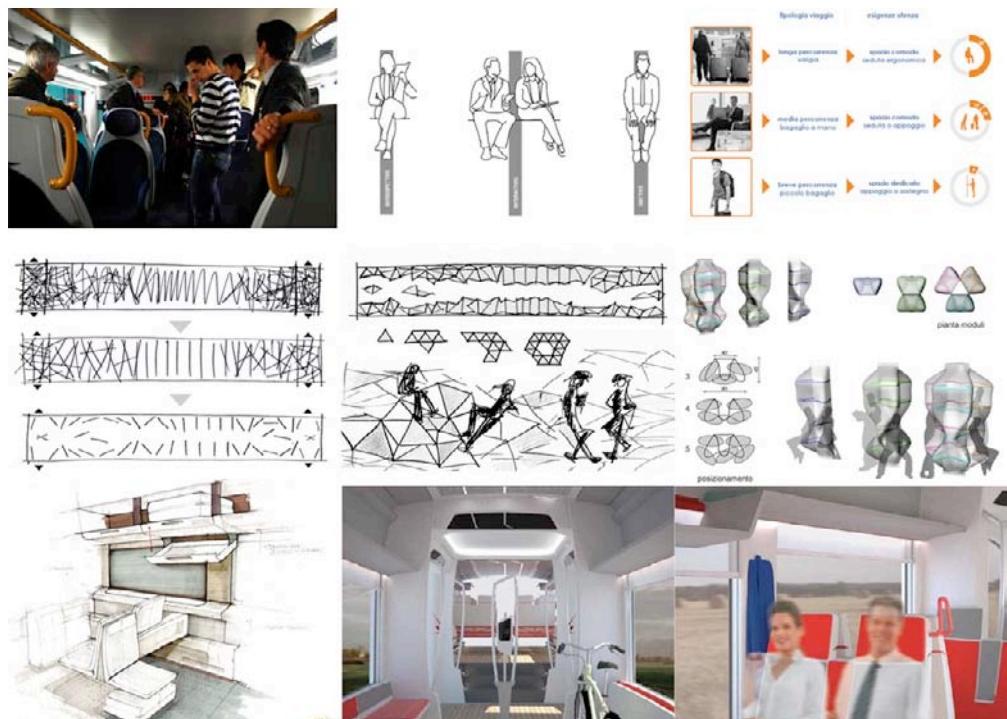

FIG. 2. A FEW IMAGES FROM THE DESIGN ACTIVITY FOR ANSALDO BREDA COMPANY.

3_ Training /design approach.

The above mentioned example introduces the evaluation of the training process. What kind of approach was carried out? Each of the experiences studied were classified according to three different levels of intervention.

a) Action. (product design-oriented) It includes those experiences (58%) that were conducted with a targeted approach to product development, material or immaterial. This includes those experiences implemented through the traditional steps of the design process, involving the basic skills of design, thought within the laboratories. The design is meant to be the "shaping" expertise.

b) Direction. As direction experiences (22%) with companies / organizations / institutions oriented towards a possible result, predefined but shared, and guided by design tools were classified together with those activities in which design enters the process at a strategy level, often possible in second generation relationships. Among them there are, for example, those born after a previous experience of product development (design-oriented tools).

c) Activism. The term refers to those activities able to catalyse, to stimulate, to give life to change, including social and / or cultural transformations. In this level, those conventions (20%) where the design approach is oriented to develop a process (or a product) as part of what we defined as a Fringe Design (*border design*), where design tools are tested to the limits of their power were placed. Those activities in which the design took a proactive role fall into activism area. In these conventions, the process tends to interpret teaching and workshop activities as a research work for groups rather than as a fixed transmission of knowledge and expertise.

In the level *activism* conventions very different from each other are included. For example, in the Finnmark (a company that manages the health-Expo in Verona) project, in 2007, the DSA was commissioned the following initial study: "The therapeutic space, the environment as a method of treatment for patients with dementia", within an interdisciplinary group. The result was a publication of a book and the seminar presentation. Following the results achieved, in 2008, a subsequent task was commissioned, where the design assumed a coordinating role as project activator and leader of a team of interdisciplinary researcher. Seven companies were involved, and with their help a workshop was organized with 100 students and graduate students to study objects and new solutions for independent living and home care for patients suffering from Alzheimer's.

Afterwards, through the work of selected small groups, some products were engineered and / or prototyped at the companies, and later presented at the Fair.

The typical approach of the company is often oriented to solve problems related to everyday work. The relationship with the University team and the ensuing confrontation on its innovative potential, identified during an audit phase, leads to the definition of a project brief, which is afterwards assigned to young designers (students).

What emerges, in particular for some of the analysed experiences, is how the choices of the industry and its expectations in respect to the project are often re-oriented, involving, in addition to the product, communication strategy, a sign of gradual understanding of the real possibilities of design and the clear need to reset some basic strategies of the company.

Freeing themselves from the idea of working primarily on the product, some projects dealt with larger areas, related to communication and to the structuring of the firm's ability to offer services and redefine the corporate image, identifying new markets and related strategies.

4_Design Method

For what concerns the method, a simplified classification was chosen, distinguishing two main groups: traditional (72%) and non-traditional (28%). In the first those activities were included in which the work was carried out in working groups, within the laboratories, workshops or training, according to the most common practices.

In this category the experiences carried out in open workshops at a national level, or those where external and professional freelancers participated were included. However, those activities in which an alternative method was experienced, in some cases prompted by the subject, in others pushed by a more specific desire to experiment were classified as non-traditional.

An example is the activity carried out with Philips GmbH, in 2008, "new fields of application of OLED lighting," which included a workshop at the University of Genoa with 100 students, and an advanced-level workshop with a group selected out of the laboratories of Philips Research Centre in Aachen. The presentation of the results (including a patent) was held at the Science Festival in Genoa.

5_After effects

In the collaborations between universities and enterprises the induced effects are an important element. What kind of relationships and what opportunities were generated the activities? Some of them created new collaborative activities in continuation to those already made, some promoted the activation of new agreements with other parties, and others offered job opportunities, internships, recruitment or funded research grants and fellowships doctorate.

Our research showed that the development of new relationships or career opportunities did not depend on the training method used. An important element, instead, was the role of design. Where the design played a leading role in promoting new tools and creative strategies (direction and activism) conventions brought, more easily, to new research opportunities and to other conventions, generating a virtuous circle both for the training activity and for the industry.

An excellent case study in this sense is the relation with the Boero Group (active since 2004).

Along with the progress of the relationship, we evolved from specific consultancy project to a synergistic relationship of business strategy for the development of projects and methods for colour enhancement. Over 20 projects were carried out in different areas, from packaging services for retail and artefacts, to communication projects including international events, such as Home Decor, or colour design projects.

Focusing on situations such as treatment centres or schools, up to the entire urban areas it was possible to experiment solutions, triggering a process of innovation within the company and also in relations with the second part each time involved.

In the project "Colour and Life", 2009, a training event was organized, involving the public and the distribution network in a process of design-thinking. Afterwards a workshop followed, held within the corporate labs and finished at the University. 50 selected students were involved in a collaboration model in mixed groups and yielded a meta-project for new outlets of the product colour. The chosen projects were prized and fulfilled by groups of students in an internship experience.

SHAPING DATA TO BRING OUT MEANINGS. APPROACH AND RESULTS

Charts and graphs are excellent ways to dig more deeply into a dataset, to tell a story from numbers, effectively helping to draw a picture of a given situation.

Semiotics acknowledged the homo sapiens' ability to recognize and read signs and codes and its instinctive need for them (Lotman, 1974). Our modern society is becoming more and more accustomed to recognize symbols and read graphics, thus we can generally trust and rely on the fact that graphics will be recognized as information vehicles.

Nevertheless it is necessary, when designing a visualization tool, to focus on the need of easing the access to information in a more direct and quicker way, and to make it understandable not only by the researchers and data owners, but also by non-expert audiences.

"The main goal of data visualization is its ability to visualize data, aiming to be more effective, immediate and clear in communicating information."[4]

To convey ideas effectively, both from aesthetic form and functionality, needs to focus on the meaning of the dataset, providing insights even for sparse and/or complex datasets, by communicating their key aspects in a more intuitive way. While it is crucial to be very comfortable with the dataset and master the data to effectively design visualizations, an outsider (and thus someone not familiar with the data) will be able to understand them thanks to the visualization.

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[4] The Printed Smashing Books Released in February 2009 by Smashing Media GmbH.

Pie charts

To this purpose, traditional pie charts, drawn from percentages and rates, are very good at showing information like distribution and preponderance.

We used pie charts to see the distribution of the three kind of results we highlighted (60% products, 34% concepts, 6% prototypes) , the rather uniform distribution among partner types (36% public administrations, institutes and associations, 22% big companies, 42% small enterprises – reflecting quite faithfully the local economic situation), and the training design approach method where the predominance of the action approach (58% action, 20% activism, 22% direction) was immediately visible.

An efficient info-graphic will also allow the insiders and researchers to analyse the data in a better way, drawing out of them new information and meanings, discovering relation-ships, connections and links hidden behind the numbers themselves, that might otherwise not be visible, or at least not very easily so in a database file or in a pie chart.

Our own research started from a big Excel file, crucial in the selection phase of the 50 con-ventions and constituting the base for the construction of the dataset. As the dataset was getting more and more complex, the file was growing bigger and more dispersed.
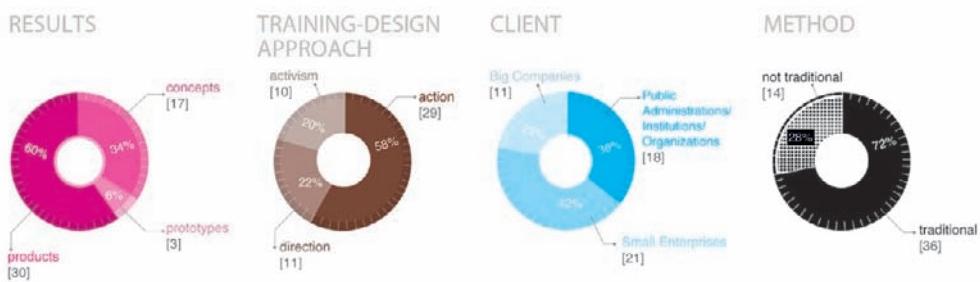

FIG. 3. PIE CHARTS REPRESENTING OUR DATA.

In order to analyse our data and understand the key points at the base of the educational process we needed to design a graphic visualization that could help us see the connections between the different parameters and their values for each of the 50 conventions, the kind of information that our pie charts could not make visible.

Star shaped visualization

The visualization we chose , to support our analysis, among other solutions we tried, is constellation system shaped.

This visualization permits to add, gradually, different levels of information. Each level

corresponds to the analysis metrics that we used, translated into a graphic sign.

Period = size of the icons (chosen to be a meaningful image of the convention)

The icons of the 50 conventions have growing dimensions according to the year each convention began, from the smaller and older ones, to the bigger and more recent ones.

Results (concepts, prototypes, products)

The icons are positioned around the results achieved. By connecting every single convention to its result it becomes immediately visible how the result of most of the older conventions was a product, compared to the more recent ones that lead to a concept or a prototype. These last two families of conventions, especially as they are more recent, give the hope that their results will possibly be further developed into finished products in a new convention.
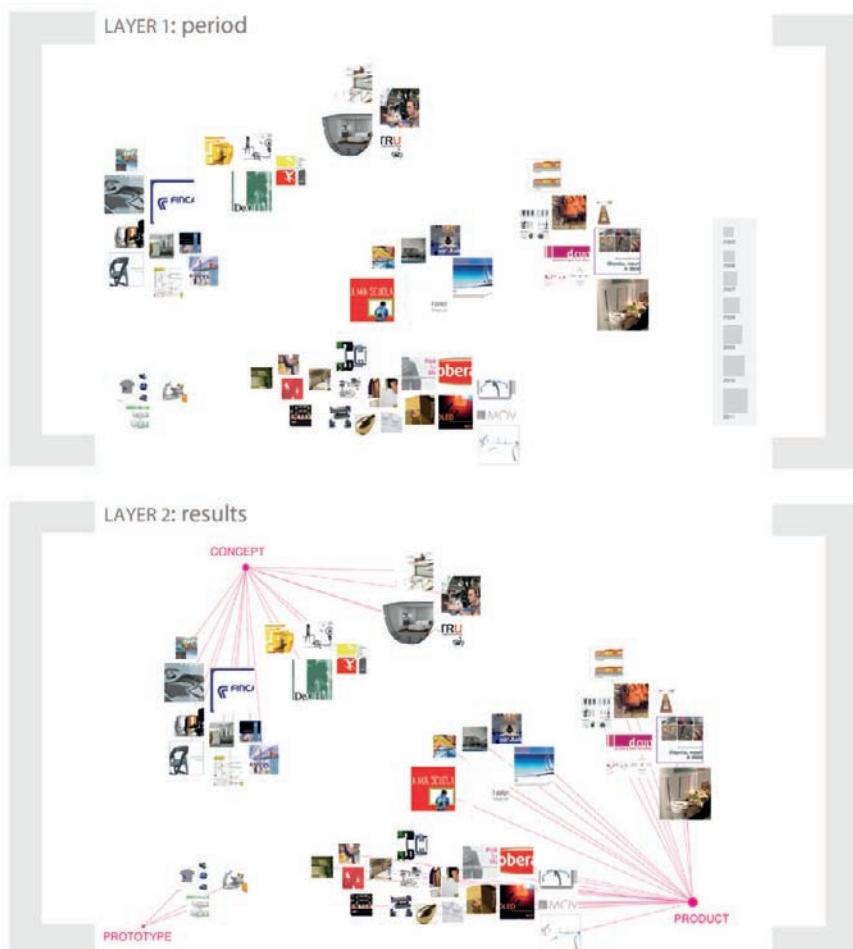

FIG. 4. STAR SHAPED VISUALIZATION: LAYER 1 PERIOD; LAYER 2 RESULTS.

Training design approach = brown circles (size is in direct ratio with the percentage of conventions involved)

Adding the training design approach level, as three planets that attract each convention according to the approach involved, we note that the product-oriented approach, identified as action, is the most popular among the conventions aiming at developing a product. This same approach collects all the three conventions leading to a prototype.

It is also evident that the majority of the action approach was used in older conventions. Naturally this approach is more common, and more conventional, while direction and activism took hold in recent times.
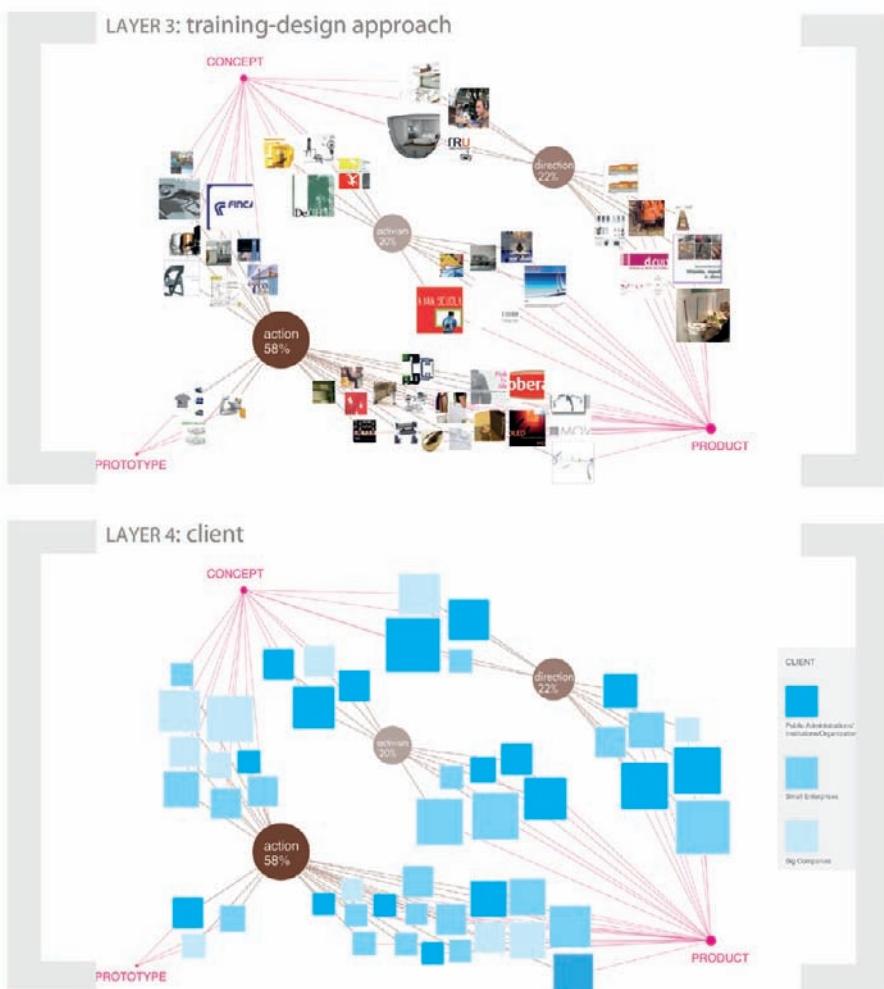

FIG. 5. STAR SHAPED VISUALIZATION: LAYER 3 TRAINING DESIGN APPROACH; LAYER 4 CLIENT.

We might argue that, before, a more passive role of design was expected and required and that the collaboration with the University was probably sought more for the proficiency of its collaborators and the quality of its the results, and partially maybe for political or economical reasons.

In the last years this tendency seems to be gradually changing, giving more importance also to other aspects like its innovative capacity and creativity in researching (and finding) new strategies and design processes, activating a positive evolution for the reciprocal cooperation and growth for both the productive (industry) and the training system (university).

Clients = three shades of blue colour (overlapped layer to corresponding conventions)
Comparing the clients' pie chart with our visualization (fig.3 & fig.5) the uniformity of the distribution of the client types was also confirmed throughout the period that we chose, since it is evident that there is no particular concentration of one of the three in certain years. At this level the visualization helped us to note another interesting fact: for the most part, small and medium businesses turned to University with a defined brief and a specific request, implying a "classic" role of design. As we have already seen, this classic role is the most suitable way to implement the phases of the traditional process of design training to get to a finished product.

These conventions are therefore the most likely candidates for teaching and training, exposing every designer to the basic steps of a project that they must master.

On the contrary, the agreements with public authorities or associations often give the opportunity to address the task with a research oriented mindset, linked to an approach in which students can use tools , knowledge, and design options to research and propose solutions appropriate to the customer's needs, and to guide their strategic choices. The visualization shows that a majority of the conventions that have an activism design approach were held with public administrations.

Method = black/traditional – dotted/non traditional (overlapped layer to corresponding conventions)
In our visualization it has been interesting to discover that a traditional training method is preferred in those agreements in which the approach of design are in the action type, that is, a more classical approach, a choice in accord with the very nature of the request.

In fact it emerges that all the 86% of the conventions in the action area were approached with a traditional training method, acknowledged to be effective in training students and guide them in learning the basic tools of design.

A less traditional method perhaps, by its very nature, leads naturally to a proactive approach to training and a promotive design, which becomes an active part in the relationship and strategic cooperation, with new solutions and a wider vision of the target.

After effects = violet circles (external to the constellation, connected with each convention that gave rise to new opportunities for collaboration, new agreements with other parties, offered job opportunities,

internships, permanent positions, or funded research grants and scholarships.)
Adding the after effects layer to the training method we could understand that the process
of fertilization and the possibility of new relationships or career and research opportunities
did not seem to depend on the training method used.

Instead, the role of design emerged to be the strong point in promoting new relationships.
Where, in fact, the design played a leading role (direction and activism), 70% of the con-
ventions led to new relationships (90% if activism alone is considered, promoting new and
creative strategies and tools, creating new research opportunities and other collaborations
in a virtuous circle for both the university and for the company.)

*To conclude, our Info-graphic shaped the very process we intended to document, that is the collaboration
with the industry throughout a selected period. It helped us understand a complex system, analyse and
comprehend the results achieved, identify possible problems, and report a growing change in the educa-
tional attitude, precious information in the future for programming and managing incoming conventions.*
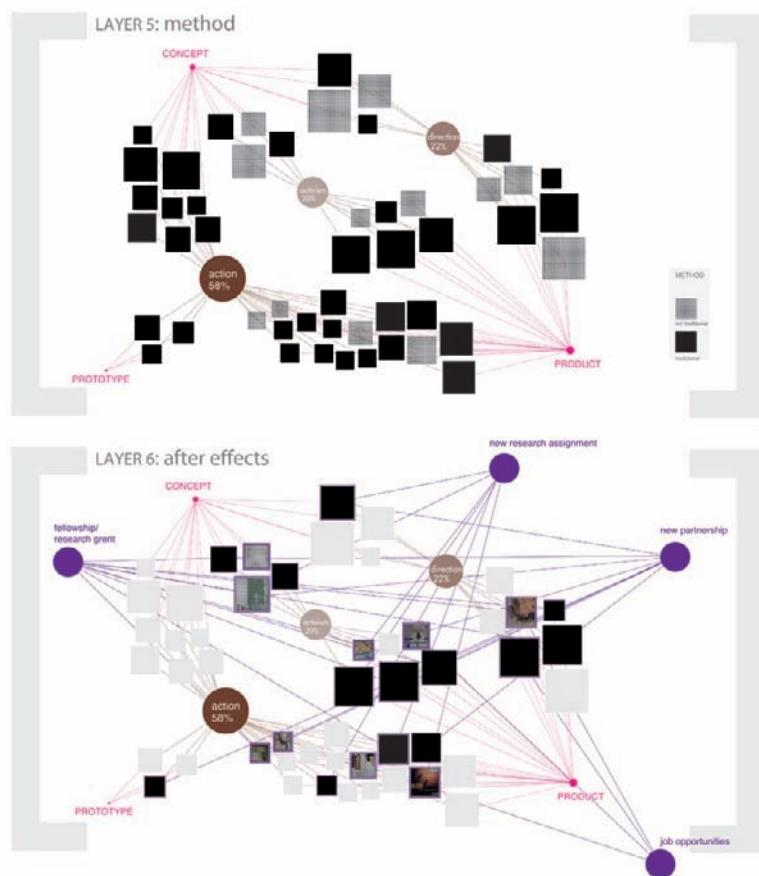

FIG. 6. STAR SHAPED VISUALIZATION: LAYER 5 METHOD; LAYER 6 AFTER EFFECTS.

CONCLUSIONS. COLLABORATIVE MODELS - CONTEMPORARY ROLES FOR DESIGNERS

The measurement of quantitative and qualitative data led us to design explorations in data visualisation, transforming complex data into an understandable narrative. This creative effort has been and will be able to offer strategic opportunities for the evaluation and planning of training in the design world.

Design is changing, hence scholarly training cannot fail to follow such an evolution. Students will be the new creative, facilitating and motivating force to prompt tomorrow's sustainable changes. Yet, it is necessary to provide opportunity for them to practice and embrace these innovative roles through collaborative projects, encouraging context that enable them to create narratives and storytelling experiences, through relationships across different cultures such as academia and the corporate sector.

A focus on relationships and collaborative models is one of the main aspects that mark the emergence of new approaches design education. Working in synergy by integrating skills and proceeding from the needs of those located in this reality, and in particular promoting applied and experimental research, means developing multidisciplinary connections in which companies can achieve tangible results on qualified research and on innovation, while the academic community can measure itself and grow by solving real-world problems. It is in this sense possible to find much common ground upon which to connect, and then to point out where an innovative way to change perceptions can be developed.

In the first place, what emerges from Genoa's experience is that the role of design is certainly the essential engine of new relationships. Where, in fact, design played a directive and creative role in promoting new strategies and tools, the conventions led more easily to new opportunities for research and for other collaborations, sparking off a virtuous circle

FIG7. GRAPHS REPRESENTING COLLABORATIVE MODELS BETWEEN COMPANY AND UNIVERSITY. FROM LEFT: PRODUCT DESIGN-ORIENTED MODEL, TOOLS DESIGN-ORIENTED MODEL, FRINGE DESIGN-ORIENTED MODEL.

for both the university and its educational activities. The type of processes applied and the quality of results were closely related to the relationships and roles of those involved. Of course, there are no forms and collaborative models that are universally valid. Each choice must be a harmony between the actors that interact in the process in respect of the resources and the two specific cultures: that of training and that of business. However, this mapping project allowed us to define and represent three types of collaboration in which different relationships among the actors involved and the role of design could be distinguished.

The first collaborative model, called "product design oriented", is the traditional one, where students have the role of developers creative and in which design is the instrument subordinated to the project to achieve a result earlier planned by the company. This relationship is essential for the basic training of students.

The second collaborative represented relationship deals with definition of a purpose shared between company and university, with design as a partner, while the students are creative strategists. In this case the company gives the design process a role of director which tries out unconventional methods through a multidisciplinary project synergistically managed together by a mixed team composed of University and Business.

This is a collaborative model that represents a type of relationship in which design has the function of partner and coordinator-director and students must have already acquired basic training and a well-established awareness of the available tools. The training approach is therefore "direction type".

The third collaborative model is located in what was defined "border design". This is at the limits of the discipline's traditional area of expertise, and sees design as process activator as well as research and purpose supporter in order to provide the company with answers in a close collaborative relationship and dialogue among companies and universities whose students, once acquired and metabolised an awareness of the tools and methodology of the project, can play a proactive creative role.

Relationships, communication and information are the basis for a shared creative process. Designing means to activate new processes to obtain a deeper understanding of society and their needs, to identify opportunities, to generate creative possibilities, to invent innovative effective solutions, and to present them to the world as innovations suitable for multiple scales. The essence of designing can demonstrate how design can be an effective method which is applicable to situations far from the horizons of traditional design, such as health, transformation of education, sustainable development and so forth, up to larger scales of strategic planning, organisational transformation and public policy. A proper definition is provided by George Cox[5]:"*Design* is what links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. *Design* may be de-

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[5] From The Cox Review of Creativity in Business in wich Sir George Cox describes the importance of creativity, design and innovation to business performance and the UK economy. Sir George Cox is Chairman of the Design Council, before which he was Director General of the Institute of Directors from 1999 to 2004.

scribed as creativity deployed to a specific end."

Nowadays, there is a need to redefine the role of conscious action able to invite to action, transmit values, to produce culture, to become a necessary strategy to design social welfare and new behaviours, as well as to be a process developing sharing and meaning assimilation actions with full awareness of the meaning of communication and ethics, while also providing new systems of production and consumption. Design, therefore, should be seen as a verb, not just as a noun. It should be conceived as a planning action which is not driven by processes, but activates new processes itself, bringing culture, claiming a social role, and representing the will for substantial changes.

It is now imperative to provide answers to a world that asks for a conscious design while remaining linked to local trademarks with a global environmental vision and a critical view of technology.

We need to stimulate curiosity and vitality, dialogue, discussion, listening, therefore pushing to participative and common growth, and creating critical viewers. The designer must be seen as an educator able to produce change through the project and through new attitudes.

Yet, who should educate the designer? Toward which direction should the designer's training be oriented? It is perhaps necessary to increase the designer's training, conscious that the project could be much more valid and consistent if those who develop it are able to weave together science, art, technology, philosophy, economics, computer science, psychology, and even neuroscience, thus creating as many connections and relationships as possible among these fields.

The designers of tomorrow will have to be multitasking brains to produce a holistic design of the project's vision, with an imaginative capacity to investigate the project field seen as *pro-iacere* (Chia, 2008): moving forward, building new places of vision and new possibilities. Italo Calvino in his *Lezioni Americane* (1988) talks about the strength of imagination and vision as a intrinsic to the project:

> "Se ho incluso la visibilità nel mio elenco di valori da salvare è per avvertire del pericolo che stiamo correndo di perdere una facoltà umana fondamentale: il potere di mettere a fuoco visioni a occhi chiusi, di far scaturire visioni e forme dall'allineamento di caratteri alfabetici neri su una pagina bianca, di pensare per immagini. Penso a una possibile pedagogia dell'immaginazione che abitui a controllare la propria visione interiore senza soffocarla e senza d'altra parte lasciarla cadere in un confuso, labile fantasticare, ma permettendo che le immagini si cristallizzino in una forma ben definita, memorabile, autosufficiente, "icastica"."[6]

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[6] "If I have included the visibility on my list of values to be saved is to warn of the danger we are running of losing a basic human faculty: the power to focus on visions with closed eyes, to create visions and forms from alignment of black alphabetic types on a white page, to think through pictures. I think about a pedagogy of the imagination that can teach the control of an inner vision without suffocating it while also not letting it fall into confused, unstable fantasising, but allowing the images to crystallise in a well-defined, memorable, self-sufficient, "figurative" form."

It seems necessary to invest in knowledge at first, reinventing teaching through an educational system that develops knowledge, skills and attitudes necessary for intercultural dialogue, critical thinking, problem solving and imagination; secondly, it is important to support culture by creating new links between different fields and business to stimulate the creative industries to innovate. We should encourage companies to combine scientific knowledge with empirical knowledge and diversify their staff in terms of gender, training and nationality. Innovation, employment and education policies must co-exist in a major project that sees the synergy of different skills in the processes of change.

> "Process is more important than outcome. When the outcome drives the process we will only ever go to where we've already been. If process drives outcome we may not know where we're going, but we will know we want to be there." Make new words.

Expand the lexicon. The new conditions demand a new way of thinking. The thinking demands new forms of expression. The expression generates new conditions."

These are two of Bruce Mau's forty-three guidelines (2004) to govern the design process and outline the attitude of the designer and the very essence of design, which, in its nature as an activator of processe, is associated to the concept of meme (Daw Kins, 1994), a cultural element that, like a gene, tends to replicate itself leading to the spontaneous emergence of evolutionary effect in the cultural field.

Thus Design becomes a vehicle of diffusion and of cultural contamination. Designer as director of tomorrow's cultural mutation.

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STRAND 2
INNOVATIVE INSTRUMENTS FOR DESIGN TEACHING

OBSERVATORY OF ECO-PACK. RESEARCH AND TEACHING EXCHANGE FIELD

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The Department of Architecture and Design (DAD) and the course on Environmental Requirements of Industrial Products founded the Observatory of Eco-Pack (OEP) in 2005. The OEP is a strategic body that joins theoretical research with teaching: part of the pack screening is updated by the students of the course, so they can work together with the researchers and develop their critical sense. The OEP conducts a complete screening of the packaging production sector according to specific methodological choices that examine many aspects and consists of a qualitative part (coherence in forms, dismounting...) and a quantitative one (simplified LCA).

The cross analysis of all data provides a map of the general characteristics and of problems of packaging on the market. This complete analysis gives the chance to improve existing packaging and begin the definition of new guidelines to design packaging *ex-novo*. At last, it is possible to obtain specific proposals for each sector, in order to design a new sustainable pack.

••• Packaging, environment, data-bank, guidelines,
qualitative and quantitative analysis •••

INTRODUCTION

The most sustainable packaging is no packaging.

Packaging in an answer to archaic need of human being, since XX century, it becomes the symbols expression of a brand and the consumers recognize themselves in purchased products. The primary function of sales packaging is to protect the product until it is ready

for use, but it is as important as its marketing function, that influence the sales package decision. This function has clout to the competitiveness of the product (Prendergast G., and Pitt L., 1996).

Starting from 1990s, a trade-off between the primary and marketing function of the package and the environmental demands can be claimed. Particular consumer concerns relate to the effect of packaging on resource use, energy consumption, pollution, solid waste and litter (Lawson, R., and Wall S., 1993). Furthermore, the litter is an environmental and social problem that is closely related to packaging. the design of a packaging influences also the behaviours and the changes of it being littered.

Pressure for environmentally friendly packaging is not only coming from consumers but from EU directives. The EU has issued a wave of directives, some of which have direct implications for packaging. There are nearly 200 EC/EU directives and decisions, which deal specifically with environmental areas (Protero A., McDonagh P., 1992). The European Parliament and Council Directive 94/62/EC of 20 December 1994 on Packaging and Packaging waste have been many successive amendments and corrections[1], directly incorporated in the basic text. This directive focuses on increasing the recycling of packaging material and reducing the level of packaging waste, has major implications for marketing and logistics.

Given that there are both consumer and legislative pressures on companies to rethink their packaging, the question remains if design a package more environmentally compatible reduces its ability to protect and promote the product.

From these remarks and needs, the research group from POLITO DESIGN decided to implement the Oservatory of Eco-Pack (OEP): tools, systems, and strategies for innovative package design.

METHODOLOGY

The OEP is designed as a research field where education, research and production can merge and dialogue.

In the bachelor degree in Design and visual communication (Politecnico di Torino), the courses of Environmental requirements of Industrial Products and of Industrial design and packaging involves the students to implement the data base and to reflect on design processes. Forthermore, some workshop on the topic are organized for students that want to have a full-time experience on design eco-packaging with different tutors from academics and from companies. Some students decide to work on that topic for their thesis, so those are the moment when the studies, the analysis, and the concepts becomes real design process.

The research is always improved by the interaction with other researchers from other uni-

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[1] Directive 2004/12/EC, Directive 2005/20/EC and Regulation (EC) No 219/2009

versities abroad, with experts and managers from industrial sectors, and with the bachelor, master and doctoral students.

In the wake of environmental legislation and consumer demand for more environmentally friendly sales packaging many companies will be forced into a position of redesigning their packages. When it comes to this redesign, or developing a new sales package altogether, environmentally friendly packaging may offer a competitive advantage.

FIG. 1. EXAMPLE OF EVALUATION ICONS AND THEIR MEANINGS.

The OEP is founded in 2005 by the Assistant Professor Paolo Tamborrini, who coordinates the research group: Silvia Barbero, Clara Ceppa, Gian Paolo Marino, Cristina Allione, Dario Toso, Amina Pereno, Erika Vicaretti.

It is organized in:

• Typologies (contexts: person, environment and society): In order to make an organic and complete analysis, it was necessary to divide the packaging sector in twelve major categories that fit into three different contexts within industrial products are configured, based on different dynamics and fruitive relationship with the consumer. So the three contexts group the twelve major categories of packaging, according to different dynamics of relation and use. Each category is considered in all its forms and types of packaging, so that a comparative analysis of the various packages belonging to a given type of product provides the first results on the most common types and environmental problems.

• Functions: the functional aspect of the packaging is essential, as the protection and preservation of the product is the very meaning of the packaging. Understanding the protective needs of the product category and the specific needs of the consumer who uses it, is the starting point of the packaging analysis. The first step of OEP analysis and categorization is therefore based on three aspects: space optimization, protective and conservative functions, packaging usability (Livingstone S., Sparks L., 1994).

• Materials: the analysis of materials and connections is another key element. The choice

of materials and of the assembly of components, contributes to making a sustainable and functional packaging. In OEP methodology, materials and connections are represented by an exploded view which shows in a immediate and intuitive way, the criticalities of the packaging. Through a simplified LCA, we can determine quantitatively the impact of packaging on the environment.

• Best practices: in addition to noting the criticalities of contemporary packaging (according to the different product categories), it is important to provide examples of good pack. An archive of positive case studies can be a useful source of inspiration for designers and students.

• Theory: the analysis is realized by the drafting of eco-guidelines for environmentally sustainable design of packaging; each category has its specific guidelines, which combine sustainability and functionality. Designing a packaging, it is also necessary to know the general rules and those of the specific product category. A synthetic but useful section on national and European regulations, allows the designer to have full and complete guidelines for his project. Finally lecture's video are loaded on OEP platform, they are useful for the students attending the class, but also interesting for researchers and professionals who want to be updated on the progress of research in environmental sustainability.

• Networking: the OEP tries to be as exhaustive as possible, but to provide a comprehensive point of view is useful and interesting to create a network of portals and websites devoted to research in packaging and design fields. For example Packaging Design Archive, Comieco lab packaging & design, Laboratorio Chimico Camera di Commercio di Torino.

• Wiki-pack: each category, above all the "Best Practices", can be freely updated. Everyone can add products, information and his own analysis to implement the platform.

FIG. 2. EXAMPLE OF WIKI-PACK INTERFACE.

Besides the criteria, underlying concepts and principles, most discussions towards achieving goals for sustainable packaging are focused on details of models and practices adopted by the industry, and the effectiveness and practicality of these practices in balancing the economic profits and environmental benefits.
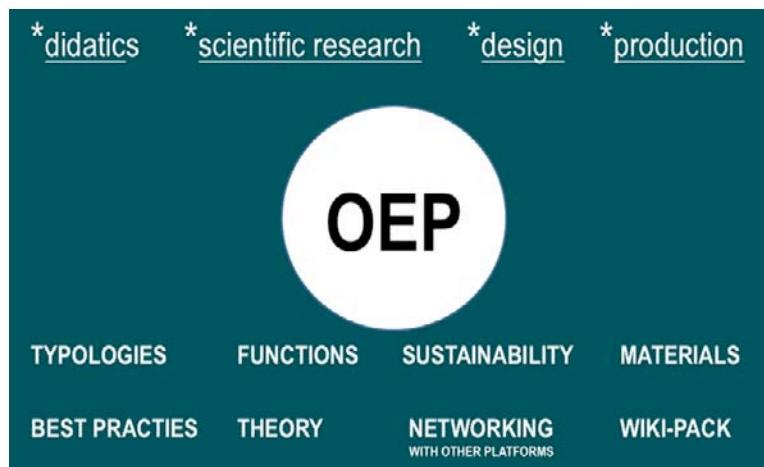
FIG. 3. ORGANIZATION OF OEP.

The OEP help to answer to the following questions:
1⁄ How we can form ecopack designers?
2⁄ How we can manage the complexity of ecopack project?
3⁄ How we can design the quality of packaging?
4⁄ How the production can push the innovation in packaging sector?

RESULTS
OEP is
• tools for didactics on sustainable pack;
• tools for firms on new technologies and materials;
• tools for designers on contaminate different sectors and find new solutions;
• through the wiki concept, it grow up with analysis and tests.
It is a digital platform that allow to archive, search, classify, design.

It can be useful for:
*students: learning only theoretically the environmental problems of packaging is difficult, if you need to design and make it really a sustainable product. To learn how to design, it is useful for students to have practical case studies, analyzed by themselves. Through the OEP, design students actively discover the problems of today's packaging, and learn a useful analysis methodology for their projects. The portal allows them to compare each

others and use the knowledge that they themselves have created for their studies, as well as in their future career.

*researchers: the OEP is an open platform that researchers, top managers of this tool, can integrate and use. Those who hold a class, can use the OEP tool to explain to their students how to integrate sustainability into the project; in general it is a tool to communicate some topics covered in their researches.

*designers: for designers, the platform is an interesting resource for approaching the research world. Besides being a practical tool that can be useful even for a professional, designers can participate actively integrating sections and sharing their expertise with students and other professionals. The OEP is a mutual exchange of information that it's certainly interesting for the designers'works.

*company experts: companies often seek confrontation and collaboration with the university. Anyone involved in packaging filed, can find in the OEP a first approach to the world of research. A company expert can then understand what is a sustainable design, and how the quantitative analysis, common in the industry, can be integrated by a qualitative approach. The OEP is therefore both a practical tool for information, and a place of contact between industry and research.

OEP is a sharing platform where the product-package can find different solutions in:
*Shape and function: it is preferable to design a packaging shape, appearance and ergonomics together. These are important but they can be integrated with environmental sustainability. Shapes that optimize storage and display at store, can improve the transport stage, thus reducing the impact on the environment. The function of packaging is important, today many packages are immediately throw out by the consumers. Giving one or more functions to the packaging, we can extend its life cycle and increase the product value in consumers' opinion. Thinking of a second life of packaging, is definitely a good strategy, both for environment and for brand. It is easy to propose an unintelligent or useless reuse, but a careful analysis of case studies and product category can favour a good project.

*Material: There aren't impacting materials in themselves, then there aren't perfect materials to create a perfect eco-friendly packaging. It is important to always put the material in connection with the project and with the packaging requirements that must meet. The simplified LCA allows us to assess the environmental impact of the specific material, but through the qualitative analysis we can understand how the material can help us to optimize the shape, function, communication and disposal of packaging. For example, we might say that a label made of recycled paper is more sustainable than a plastic one but if the bottle, on which we have to place it, is made of plastic too, the second label can facilitate the recycling process, making the pack mono-material. Furthermore using a label of shrinkable plastic also avoids the use of adhesives, that are problematic in the recycling

stage. This simple example shows how, through the analysis of products and packaging, you can choose the most sustainable material for a specific packaging.

*Process: The simplification and optimization of packaging also leads to the simplification of processes. The design of a new packaging strongly influences the industrial process, if for example you design a mono-material and mono-component packaging, both the relationships with suppliers and industrial processes are simplified. So an eco-friendly packaging is not only good for the environment but also for the company itself. The OEP, especially in research on good pack, it also considers the sustainability of the process and presents case studies of packaging which can greatly improve the trial stage.

*Logistic: The storage phase is a problematic and expensive both for the manufacturer and for the point of sale. Optimize the use of material, the weight and shape of a packaging improves the sustainability and allows to optimize storage. In some cases the secondary packaging is analyzed and optimized shapes and openings, can facilitate the storage but also exposure to the place of sale, facilitating the work of operators. The reduction of transport, optimization of the storage phase and facilitating the process of being sold, are parameters that are evaluated as nell'OEP make packaging more sustainable and facilitate the logistics of the whole process.

CONCLUSION

Packaging can transmit useful data to allow consumers' aware choice and also spaces dedicated to the brand and visual suggestions aimed to communicate the product value. Nowadays packaging communicates above all the brand identity and provides only the information that the manufacturer must state by law. A different kind of communication is possible, providing information about the origin of the product, its real characteristics and highlighting where and how throw out the packaging, in order to properly re-cycle it. Information and transparency can also become an effective tool of communication, to promote the product itself and the brand identity, generating consumers' affection.

The OEP enforce the eco-guideline that states the importance to design product and pack together (Lanzavecchia C., 2000). The pack has the same importance as the products that it protect inside at environmental level, so it should be designed at the same moment. In that way it is possible to find very different solutions than the common ones and really integrated products-packages. The OEP pulls up the commodities with their respective packaging, helping the reflections on them.

In that way, the quality of packaging is also guarantee in a huge and complex sense: the wrapping cannot be evaluated without its content.

The good news is that there is evidence that packaging can help (or hinder) getting a sustainable product into people's handle, which is important, and that packaging itself can be made more sustainable (improvement imperative).

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DESIGN, METADESIGN AND THE IMPORTANCE OF VISION

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In the European context today there are many reasons to rethink and re-design didactic activities. Design education in particular seems to be at the core of European Union goals:
1. The EU underlines, in several recent documents, the importance of research and educating future researchers.
2. There is a continuous stress and promotion of interdisciplinary approaches and of internationalization to maintain and improve the higher education level and strengthen its competitiveness. Within our institution there is an educational model based on the so-called *Research and didactic units*, between which there is a virtuous circle. Starting from the virtuous circle between research and education and the importance of creativity in design activities the paper will explore the importance of a metacognitive approach and the central role of envisioning activities.

••• Design, education, research, metadesign, vision, envisioning •••

DESIGN EDUCATION AND THE EUROPEAN CONTEXT

Inside Europe exist several initiatives in support of design education and research in all countries with design support. The development of design education follows different path: some states have focused on quantitative targets increasing the number of design graduates some others have recognized as a goal the quality of design education. Even though in some countries, the average unemployment rate of design graduates is higher than for other professions, in some other countries as Denmark and Finland it is acknowledged that there is a lack of designers with the right expertise. This situation led the European community to work on design policy and to consider the powerful relation between research and education strategic. As suggested in the EU working documents (European Union, 2008, 8) *the development of tools and support mechanisms for design-driven, user-centred innovation, networking and research, and collaboration in education and training are areas of action that could help remove some of the barriers to better use of design in Europe.* Moreover it appears urgent

the need to train professionally active designers to take better account of recent developments in design-driven innovation.

Design research is still a relatively small and recent discipline, inadequately recognized and not properly connected with more established areas of innovation research (European Union, 2008, 50).

If we want design to be considered as a strategic advantage, it is important that not only designers inside companies or design academics understand the potential of design but also that the entire scientific and business community considers design as a key asset as well. To reach this target the American Design Management Institute, for example, promotes design thinking among non-design executives, providing training and research. It has been suggested that design should be an integral part of business school training, as it happens in the Rothman Business School of Toronto, and also in engineering and architecture. In the same way, management should be an integral part of design education. The need of an eclectic instruction is continuously stressed and promoted by the European Union through an interdisciplinary approach and internationalization to maintain and improve the higher education level and strengthen its competitiveness.

## RELATION BETWEEN RESEARCH AND EDUCATION

The document signed in Bergen underlines the importance of research, education to research, and promotion of interdisciplinarity, in order to maintain and improve the quality of higher education and strengthen its competitiveness. The polytechnic culture is an expression of a two sided medal: engineering on one side and artistic architectonic on the other. It represents, maybe more than any other university culture, a fertile field of development for design disciplines, and for the multi-disciplinary approach that is part of our School of Design.

At the core of this work there is the conviction that design has a pervasive character and specific cognitive properties (Oxman, 1999; Cross, 2000; Downton, 2000). Furthermore, in didactic context, the role of design cannot be limited to defining the course contents; design should extend its role beyond its area of comfort. This means engaging into the strategic and organizational transformation of education (Celi, Ramponi 2009).

The role of research within education is important but, in the design field, it is necessary to distinguish between three different types of research: research *in* (or *on*) design, often carried out starting from other disciplines (historical interpretation, a sociological or technological one); research *for* design, as in research and development units (R&D); and research *through* design, where the project practice has a methodological role. Research through design regards didactics more closely than other forms of research: in such case, design is a research vehicle and represents a means of communicating results. Research through design has been examined by different authors, who have defined it as either practice-led research, action research, or project-grounded research. Alain Findeli (2000) in particular

regarded such forms of research as variants of research on design with a special accent on theoretical aspects, stressing the role of creativity and claiming its independence from other disciplines:

> *"[…] we are left with the conviction that there is indeed a specific "designerly way of knowing", that this knowledge and its objects deserve to be investigated and that creativity is a necessity, not only for design practice, but also for design research. Also, we may be confident that, after having depended on so many foreign - sometimes even exotic - academic disciplines, design is about to gain its sovereignty and to contribute to general knowledge, by posing new and relevant research questions and by helping reduce uncertainty and ignorance about what concerns us all: the nature, meaning, and purpose of the relationships of human beings with the world, especially the artificial world."*
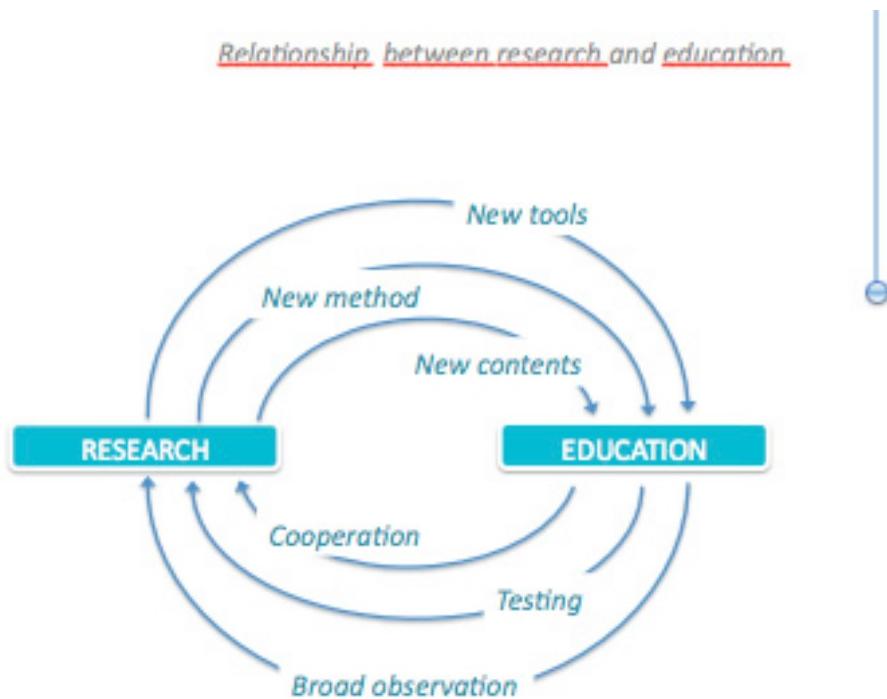
RELASHIONSHIP BETWEEN RESEARCH AND EDUCATION INSIDE INDACO DEPARTMENT AT POLITECNICO DI MILANO

FIG. 1. THE RELATION BETWEEN RESEARCH AND EDUCATION IS A VIRTUOUS RECURSIVE CYCLE IN WHICH THE TWO PARTS FEED EACH OTHER AND STIMULATE A CONTINUOUS PROCESS OF REFLECTION AS SHÖN ADVOCATES.

DESIGNERLY WAYS OF KNOWING

It is meaningful to observe that the concept of specific *designerly ways of knowing* arises for the first time together with the development of new educational approaches in design. As clearly articulated in the journal Design Studies by Nigel Cross (1982) just as other intellectual cultures concentrate on the underlying forms of knowledge peculiar to their nature, so design discipline must converge on the "designerly" ways of knowing, thinking, and acting. Design problems are often problems with a large number of open constraints-parameters whose values are left unspecified in the problem statement. Solving an ill-structured problem is partly a process of resolving these constraints (Guindon, 1990). Simon, emphasizing the role of the problem solver, wrote "There is much merit to the claim that much problem solving effort is directed at structuring problems, and only a fraction of it at solving problems once they are structured" (Simon, 1973, 187).

After Schön's work (1972) many researchers have realized that design practice has its own strong and appropriate intellectual culture, and that when design research is integrated into the design process new and unexpected question emerge directly from the act of design (Zimmerman, 2003).

Design has always been understood, interpreted and told as a process. As Maldonado argued design consists in coordinating, integrating and articulating all the factors that contribute to the constitutive process of the object' shape. But there is also a recursive dimension: the iteration of the process activates the reflection on action and the design process becomes a process of knowledge.

Searching for an education model that can help us to codify designerly ways of knowing as well as the recursive and reflective dimension, we can make a comparison with the interpretation that Leslie Cunliffe applies to learning in the arts. Cultural construction is achieved through the mediation of different learning styles:

• Defining new knowledge though comparison with the mapping of previous knowledge;
• Including students' previous knowledge within a set environment;
• Reorganising the activities that result from a difference between the new information received from culture and previous knowledge;
• Perfecting schemes that allow the students to fine-tune their previous knowledge making it more accurate and understandable.

It is therefore through *mediation* that critical experience is emphasized so that the subject who is learning can create a cognitive frame in which the various aspects of the experiences carried out are mapped in relation to one another creating a network of meanings. The creation of cross references and the overlapping of areas of different design experiences are the uniting elements between design procedures, and previous theories and knowledge which together make up the curriculum of a designer (Celi, 2005).

MAKING DOMAIN Developing a cognitive map for making design	Relating the two domains by acquiring the necessary "background" discourse for design		CONTEXTUAL DOMAIN Developing a cognitive map for explaining, interpreting and valuing design
	• Using language and concepts to relate own design to that of "Design backgrounds" for new project • Using language and concepts to acquire "background" metacognitive skills for assessing and evaluating own and others design	• Using language and concepts to explain the backgrounds for new project in context • Using language and concepts to interpret and criticize design from a variety of context	
• Using a variety of investigation and making processes techniques and materials for developing cognitive routines for the project • Experimenting with different visual elements in relationship to creating meaning		• Understanding the multi-dimensional features of design context (market, production, communication, etc) • Identifying how visual elements are used for different purposes and to create meaning	

FIG. 2. CONCEPTS, LANGUAGES AND BACKGROUND.

METADESIGN AS COGNITIVE TOOL:
PROCESS, VISUAL DIMENSION AND REFLECTION IN DESIGN ACTION

The second year *Metadesign Studio*, a fundamental class of the Product Design undergraduate program, is a six-month module with a methodological core although it is not a theoretical course.

The goal of the course is to make the student experience all the design phases reflecting on them, organizing activities and explicating every cognitive step with the aim of finding, developing and internalizing one's work method.

Such model, which has been experimented for four years in an undergraduate course, offers also an interpretational pattern of group activities specifically in the disciplinary field of design.

If nowadays knowledge is less and less linked to information acquisition and it identifies more with the ability of coding and de-coding messages, the Metadesign studio held at the second year at the Politecnico School of design has the purpose to provide an approach to design knowledge, to learn how to learn, to develop metacognitive skills, to acquire autonomy in coding and decoding information.

The Greek term Μετά means "through, after, behind, between" and over time it has

acquired the meaning of "beyond, further than": in the specific context of our discipline, Metadesign means *project of the project, organization of the project* and has to deal with the *initial discourse and with a more general* and *more abstract* dimension. In the educational context, the Metadesign studio is probably a unique model and has the purpose of giving a method of work and to trigger meta-cognitive abilities. The need to decode the professional practice is the core of the inductive approach and inside our course this translates into role games in which students have to cooperate within small design teams to develop a specific project for a specific company. The main focus of this experience is set on the pre-project research phase: understanding the elements of the context (territory, market, company, stakeholders…), considering needs of all the actors involved in the process not only of the final user, exploring (and forgetting!) all the already existing solutions, to reach a new concept.

The didactic activity of Metadesign studio is divided into theoretical lessons, lessons to support the assignment (or tools), and continuous reviews of group projects. The theoretical lessons are oriented to draw cultural background elements, and to provide stimuli and suggestions to rebuild the design context. The *tools* lessons, week by week, address the students with some practical indications for their work: research planning methodology, information about references, solution for research communication trough info-graphics, critical instruments and a visualization kit.

Nevertheless, review activity still represents the most important moment of design studio. Reviews, or design juries, are the traditional way to assess student design work. Conventionally, a group of students hang up drawings to a wall (with physical models in front in the last step) and explain their design concepts orally to the professors, tutors, visiting critics and students who gather around the pin-up space. After the oral presentation is completed, critics develop oral arguments in favour or against different aspects of the student's design projects. After the presentation and the critique are completed, the exhibit spaces are dismantled, and the jury goes to review the next student.

This learning experience, adequate to design knowledge level of undergraduate students, has been conducted in two different courses with different topics: the first one, inside Product Design course is based on the project topic "Design for Food" and it proposes design issues related to typical Italian food; the second one, inside the Furniture Design course, works on entertainment spaces with the theme "*Mobili non immobili*" (furniture that is not immobile). In both cases we chose different types of objects, in order to assign similar but different issues to students. That way, students can take advantage of questions raised for other topics to improve their own knowledge and add value to their work.

Every design topic is articulated in three sub-topics: typical food or specific entertainment space with questions connected to cultural issues and behaviours during consumption phase; brand, with questions connected with industrial production and design bonds; industrial product, with questions related to market competition, product originality and innovation.

A complete overview of the three sub-topics was collected in a "design card" explaining the details of the design brief. For example, a group of students was asked to investigate the typical Italian Olive Oil, in order to design a gift pack to be produced by Alessi. The work plan is organized in three main steps: 1) Context research, 2) Research selection and inspirations (from description of needs to the concept), 3) project development (Fig.2). While the first two steps are mainly characterized by research activities, in the stage of concept development students had to work closely in groups to solve the specific design issue related to their topic.
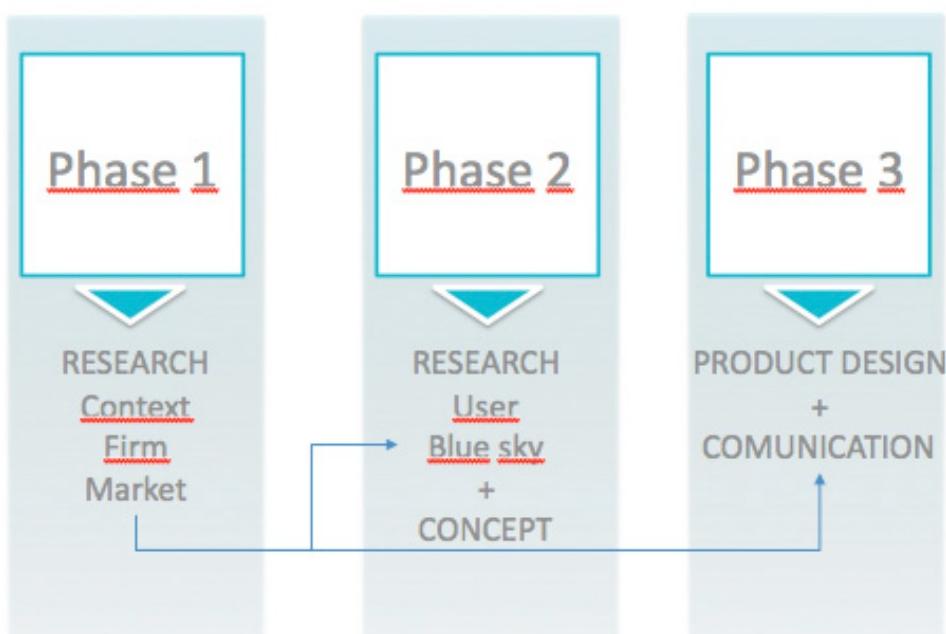
FIG. 3. THE THREE STEPS OF THE METADESIGN COURSE.

Context Research: The project research carried out by every group was organized splitting the three subtopics on the three week of exploring activities. Thus, the first week students had to collect information about their specific topic, considering cultural and technological issues connected to production, distribution and consumption. During the second week, they analyzed industrial market issues, gathering information about a precise indus-

trial brand, pointed out in the "design card", to understand which kind of technical and aesthetic constraints can affect the design process. Finally, on the third week, students had to analyze the existing industrial production, in relation with the specified product family, to identify problems related to existing products and to discover possible week areas.

Research Selection and Inspirations: After the first data collection about the context and the product, students begin a deeper research looking for useful information to define and describe the requirements. The ability to discover latent needs is often the key to the potential success of a new product and each group is requested to carry on user needs but even the company and hypothetic retailer ones. At this step, the moodboard is a key graphic tool that collects images and features that anticipate an abstract version of a concept. This tool, which has been adopted from the fashion world, becomes a new graphic expression about the product qualities even before becoming a concept.

Interconnection and synthesis: Starting from the attempt of concept identification to the definition of all the design components, students are invited to draw a diagram of connections between the gathered information to valorize the meaning of the research process which ultimately will be summarized in an original product.

ENVISIONING ACTIVITIES

When talking about research for design and in particular when focusing on the front end of innovation we have to underline that, as designers, we work primarily with images. There is a fist level in which images are a way of communicating contents and shapes but also emotions. These envisioning activities start from problem interpretation via visual stimuli (Garned & McDonagh-Philp, 2001), continue with info-graphics, sketches and finish only with the last project screening. But there is also a higher level of envisioning: a vision of the future, an image that anticipates scenarios. The ability to synthesize concepts and forms of the future through images is a more strategic ability that often makes a difference in products' success. The progressive development of metacognitive abilities and envisioning skills are complementary in design education. A research described trough good quality images but with little substance cannot sustain a successful product; only producing images within a system of meaning we could build a "design research".

VIEW | *the ability to see something*[2]

Observing reality is a form of research and at the same time of learning. The design activity often starts from the observation of users, from understanding needs and identifying problems inside real situations however the "ability to see something" could be related also to the interpretation of design activity itself. According to Rivka Oxman *design learning is the acquisition of the cognitive ability to manipulate the representations of design knowledge, to acquire basic*

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[2] The definitions have been retrived from Oxford English Dictionary http://oxforddictionaries.com.

schema in design thinking, to understand knowledge structures (Oxman, 1999). Novel designers need to acquire abilities to manipulate characteristic strategies of design thinking such as generic and typological design, adaptive design, analogical thinking and creative exploration. These cognitive abilities are not constrained to a theoretical dimension of the project. Schön clearly expresses the importance of reflection in practice for education arguing that the challenge to the professional schools, lies in helping people to become more competent in the indeterminate zones of practice, and at carrying out processes of reflection-in-action. In his thought the practical side of the discipline (or applied science) has its own cognitive abilities that are not the application of theory but represent another way of learning:

> *"I'm arguing that it (applied science n.d.r.) has a special zone of relevance which depends on our ability to do these other things, on the one hand to set problems in ways that the categories of applied science can fix and fit and, on the other hand, to fill with art the gap between theory and technique and concrete action"* (Schon, 1982).

VISUALIZE | *make (something) visible to the eye*
How can design research be expressed? When working in the design field, even if using a research approach, we need to use specific design tools. As Ochse suggests *creativity depends on technique, although, of course it goes beyond it. Routines provide creators with the symbols and the language of their culture: they provide sensory motor skill for artists, heuristics for scientist, vocabulary for poets* (Ochse, 1990). From the observation of the analysis phase until the final prototype, visualization should be used as an instrument for comprehension. The information gathered during the exploration phase may be exploitable in a better way if organized through graphic mindmaps or in flow charts.

Dimensions, colors, and different outlines are useful to assign importance and value to topics, needs and solution feasibility. Draws and sketches, on the other side, can be used to grasp knowledge about existing product solutions and get the big picture. How does it work? What are the components? How is it made? In this way drawings and sketches become both a note down tool with a mnemonic function for details and on the other hand an instrument to retrieve ideas for new solution.

Even if we think of ethnographic methodologies there are designerly ways of knowing that distinguish designers tools from those used by sociologists: mapping qualitative and quantitative methods, verbal and non verbal inquiry tools we can see that usually designers position themselves in the right upper quadrant (Plowman, 2003). The description of problems comes from deep qualitative observation and it is expressed through visual artifacts.

FIG. 4. MOOD BOARD REALIZED BY STUDENT OF THE FURNITURE DESIGN COURSE.

VISION | *the ability to think about or plan the future with imagination or wisdom*
When talking about design the term vision refers to the capacity of seeing beyond reality, the ability to imagine a new world every time, through an idea-solution that, starting from a radical innovative approach, implies new lifestyles and new behaviours rather than shape or function.

In the same way, when a company defines its vision, it identifies the values and the mission through long term objective and the description of a future perspective. It's an adventure proposal for a collective experience, a sort of entrepreneurial dream that can be carried out with the participation and the active involvement of all the collaborators.

The vision represents a strong expression to define a challenge or, to say it better, to indicate the horizons at which a project may aspire. The vision overwhelms logic and reason, opens to a broader reality with previsions and scenarios, to bet on the feasibility of a dream: it isn't a foolish plan or an adventure but the deployment of an horizon, the focalization of a great and important target to aim at with all the mental, physical, professional and emotional strengths as authentic and sincere expressions of values, needs, and feeling of people.

MOODBOARDS: FROM VISUALIZATION TO VISION

These three different levels can be associated with the Metadesign lab phases: we first ask students to observe context, enterprises, existing products, then they have to visualize the research result and to envision a product scenario trough moodboards.

The visualization and moodboard phases embody a key step toward a successful concept. Design studios have the primary role of supporting students to find their own way to become designers. It is a context concerned with enabling the development of an artistic practice based on an individual's own interests and unique vision (Winters, 2011). The moodboards, being essentially a collection of images, colours and texture with the aim of representing emotions, feelings or 'moods' suggested by the initial design brief, tend to be purely visual, and transcend linguistic restrictions. They nevertheless have an important function in developing students' ability to articulate their thinking (Garner & McDonagh-Philp, 2001). Through the examples (Fig. 4) mood boards are presented as a tool for creative problem interpretation as well as forassisting with the development and resolution of design problems once articulated. Considering that student design briefs are intentionally indefinite and vague the research direction is up to the student choice. Even if it could happen that investigative activities are directed in the wrong direction, we don't believe that it's waste of time: the occasion to gather information as an answer to a foggy brief can inspire students and give them the right amount of freedom. Although the collection of information is partial or incomplete the value of the technique depends on resources selection and elaboration. As shown in the examples we ask students to visualize information about the entertainment space and about the company – topics for which they have reliable information – but then they have to reproduce sensations that match different identities,

finding the way for a new product concept. The mood boards are the result of the exploitation of a broad variety of available and original images and of their reassembly. The mood boards are then used to suggest shape and graphic elements for concept generation.

In our experience the creation of a mood board motivates students to explore the ephemeral side of the design project trough colors, textures, shapes and images with their personal sensibility. Mood boards represents a liberating experimental phase that puts you in touch with your perceptions about the brief and to visualize them, they enable you to recognize the problem as it comes into view and to envision scenarios or future lifestyles.

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TEACHING MATERIAL DESIGN

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This paper presents and advocates a method for teaching about materials in industrial design courses. The method has been developed by the authors in the academic sphere while teaching over the last six years on a number of degree courses ⁄ both the three⁄year basic programmes and the two⁄year specialist ones ⁄ at four Italian places of learning: the Politecnico di Milano, Sapienza University of Rome, the University of Palermo and ISIA (the Higher Institute for Artistic Industries) in Florence, which is now recognized as being equivalent to a degree course.

Behind the research is a focus on a specific area of the design field which has until now been undervalued and not sufficiently expanded upon by teaching programmes, as it has always been seen as something which is simply there to be exploited. However, it has become more prominent in recent years, thanks in part to rapid technical and scientific development and the arrival on the scene of numerous new materials with unprecedented capabilities.

••• Design, teaching materials, creativity, experimentation •••

1. PREMISE

An essential premise for the research is the acknowledgement of the Italian design field's singular take on materials, which is defined here as a "creative approach to technology". The objective is to put together teaching tools and methods which embrace the unique characteristics of the Italian approach to design and are able to deal with the changes to the professional and socio⁄cultural context that teaching has to take on board.

With this premise and objective, the research project is part of the series of studies that have contributed to the development of design teaching in Italy since 1994. The theoretical and critical foundations are provided by studies carried out in other countries and most notably the debate between the positivist position on design – which is seen as a science ⁄ of Herbert

Simon (Simon, 1969)[1] and the stance of Donald Schön (Schön, 1983)[2], who reassessed the "intelligence of action" and maintained that design involves a blend of theory and practice, and that it is possible to gain knowledge which can be applied in all spheres by observing and reflecting on design processes and their effects on their surroundings. Some Italian studies based on these factors and the phenomena observed (Bertola and Manzini, 2005) have attempted to classify professional practice in order to identify general rules and principles which can be used to train designers, while making the assumption that they will evolve in line with their points of view and surroundings (Husserl, 1965). It was therefore possible to outline an Italian design research and teaching identity based on the tradition of professional practice, which ⁄ especially in Milan ⁄ also took on a significant theoretical and critical dimension from the 1950s and made an important contribution to the revitalization of industry in the period after the Second World War.

2. THE CREATIVE APPROACH TO TECHNOLOGY

Many historical and critical contributions (Doveil, 2002; Branzi, 1996) have focused on the distinctive nature of the Italian design culture and described how it managed to take precedence over the traditional engineering⁄based technical culture. This has led to the emergence of the idea of a characteristic means of design innovation with a carefully balanced blend of language, form, function and production quality, thanks to a creative process that brings together classical and technical culture.

The Italian design field has never seen technological innovation and materials solely as elements to be exploited in the creation of objects and part of a problem of constructive correctness. Instead, they are used as forms of creative input and parts of the linguistic and poetic palette of a project which can be interpreted with their inherent potential for expression and use. This characteristic of Italian design has been constantly revived in the professional field and it has been particularly prominent in certain historical periods.

In the 1950s, Italian design was only just emerging, but together with the developing industrial field it soon conducted some original linguistic experimentation. One example was Moplen[3]. The company Kartell was founded to use it in industry and it revolutionized the interiors of homes with the material. Designers used Moplen to make items and furnishings that completely shook up everyday imagery and gave it a specific identity: it was new, colourful, vivacious, light and democratic.

The 1970s were one of the most outstanding times for the Italian approach thanks to

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[1] One commendable aspect of Herbert Simon's views is that they are in contrast with the idea of design as an individual bent similar to an artistic ability.
[2] Donald Schön supports the idea of reflection in practice. One of the central topics of his reflection is moving beyond the traditional divide between thinking and acting, knowing and doing, deciding and implementing.
[3] The polypropylene is an Italian patent that was invented by Natta between 1963 and 1969.

the "design primario" or "leading design" (Branzi, 1983) movement, which shifted the focus towards the *soft* qualities and the expressive/sensory identity of materials, extending the scope of design to reinventing surfaces and materials. This marked the beginning of "material design". The business world, led by Montefibre, showed a great deal of interest in seemingly minor production issues (such as colour manuals, the decorative patterns for fabrics, and research into surfaces and their reaction to light and sound) which were actually at the heart of sophisticated industrial strategies that sought to improve the quality of the interaction between people and the designed world[4]. The idea emerged that capabilities with materials and production processes were playing an increasingly important role in the work of designers, who were able to use them to innovate with products and processes. The "silent revolution" of compounds in the late 1980s led design towards a new challenge: "previously unthought-of technology". Designers worked with the new capacities of materials and transferred technology from production sectors that make big investments in research to others that make small investments (notable transfers took place from the automotive industry to furniture). They went beyond technological boundaries and materials were pushed to their technical and symbolic limits, giving unprecedented and surprising visions of the nature of materials.

Alberto Meda is one of the exponents of this type of research. Other projects of this kind featured in a 1995 exhibition at New York's MoMA called "Mutant Materials in Contemporary Design", as well as appearing from 2003 in the "iMade" shows curated by Frida Doveil. The latter contained some interesting proposals from the Italian furniture industry in which new design ideas were developed using new materials and working processes.

In the 1990s, there was an upsurge in innovation in the field of materials. They grew in number and the implications of their use became more complex, so designers were no longer able to keep control of them with traditional forms of knowledge. The vast, bewildering range of choices (Manzini, 1986a) made people feel the need for more information in order to find their way through the supermarket of materials. Starting with the founding of Material Connexion in 1997, physical and digital *materials libraries* began to appear (Campogrande, 2009) and gradually specialize in particular classes of materials in order to bridge the gap between production companies and design professionals. In addition to the renowned Material Connexion, among the many examples are the Rome-based Matrec, which is a database for recycled materials that is free to use, and the Materioteca®, which specializes in polymers and was created in Alessandria with the support of a group of manufacturers from the field. *Materials libraries* are places where materials can also serve as input to inspire creative processes. They provide knowledge of both the technological side of materials and their aesthetic potential.

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[4] As demonstrated by the work of C. Trini Castelli between 1996 and 2008.

In its short history, Italian design has thus made an important contribution to innovation with materials by coming up with design and experimentation methods and strategies that have led to the creation of products whose material qualities have inspired new forms of behaviour and lifestyles. By using the materials that are available at the time, carrying out linguistic and performance research, and/or transferring technology and pushing the boundaries of technical knowledge, designers have played a part in the evolution of materials and frequently helped to bring about genuine innovation in processes. Their focus on the expressive and communicative value of materials and control of the emotional qualities through expert management of the technological aspects means that they have made a tangible contribution to the establishment of new objects and material qualities.

3. RESEARCH METHODOLOGY

These ideas underline the unique nature of Italian design's creative approach to technology. Taking them as its starting point, the research project looked into their effects on teaching about materials for design.

The research process involved feedback and constant fine-tuning, with three separate levels:

1. Data collection and analysis.
2. Interpretation of the data and critical elaboration.
3. Didactic experimentation.

There were two phases in the collection and quantitative/qualitative analysis of the data: a *close up* on teaching and a *close up* on the didactic research carried out in Italy in the last 10 years. The first phase involved gathering and analysing information about the courses and modules on technology and the study of materials in the teaching programmes of product and industrial design degrees in Italy[5]. The data collected came in the form of the teaching programmes outlined in descriptions of university courses and information gathered through interviews with the lecturers in charge of courses, which supplemented the findings from the desk research with details of the skills used, the approaches and the methods. The second analysis phase focused on research into resources and methods that have been developed in academic circles for teaching about materials in the last ten years.

Analysis and interpretation of the data made it possible to produce a comprehensive overview of the methods and tools that are currently at the disposal of university education in the field of technology. By comparing the education in Italy and internationally and taking into account the emerging phenomena in professional practice, critical thoughts were developed on the possibilities for technology teaching in a creative sphere and in a suitable way for the education of designers.

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[5] The research involved analysis of the product design courses at the following centres of learning: the Politecnico di Milano, Sapienza University of Rome, ISIA in Florence, the University of Florence, the University of Palermo, IUAV in Venice, the Politecnico di Torino, the Free University of Bozen-Bolzano.

Carrying out critical reflection in parallel with didactic experimentation made it possible to progressively fine-tune the teaching method proposed by the authors, which aims to make the step forward from teaching about materials for design to teaching material design.

4. CLOSE-UP ON TEACHING IN ITALY: RESULTS OF THE DATA ANALYSIS AND REMARKS

While there is a great deal of variety in the local characteristics, the relative importance of the courses and the skills used, analysis of the data on teaching in the different universities studied shows that similar scheduling criteria and approaches are currently used in the organization of materials courses.

In short, in the first year of a basic three-year degree, teaching about technological matters is essentially based on a theoretical didactic approach to provide students with knowledge of the chemical, physical and mechanical properties of traditional materials and production processes. In most cases, the skills used are in the fields of chemical engineering (for knowledge of materials) and mechanical engineering (for industrial processes). No time is devoted to craft techniques or practical assessments of materials; there are just a few mentions of the sectors and fields of use.

In the second and third years, there are theoretical courses on the materials with more in-depth study of technical and engineering matters compared to the basic course in the first year and broadening of the horizons to take in innovative materials and technologies. Only in a few cases are these theoretical courses supplemented by study and examination of the products that are considered emblematic of material innovation, for "retrospective" analysis of the entire design and production process. Analysis of the objects makes it possible to underline the correlations between their structures and properties in areas including performance and processability. It helps students to develop the ability to use the various traditional and innovative materials in the most appropriate way, understanding not only their technical characteristics but also their potential and physical limits, so that the material transformation processes and the stages in the life of a product can be managed without neglecting the key aspects relating to "observation" of the aesthetic and perceptive properties.

Furthermore, alongside the activities carried out in design workshops in this phase, there are materials modules which aim to provide an understanding of the applicatory aspects focusing on selection of the materials to meet the requirements of the project and to evaluate the feasibility of the design. However, they continue to see materials purely as elements to be exploited for the purposes of the design. It should be pointed out that there is an almost complete lack of practical and experimental activities involving materials, which is often due to the fact that there are no workshops specifically for the purpose. Consequently, design research continues to focus largely on visual perception rather than other sensory aspects. This is also true of the specialist degree programmes, which feature theoretical courses on materials and cutting edge technology together with teaching modules about

materials for design, with a particular focus on new forms of technology. Once again, the contribution of technology know-how is seen as a sort of consultancy that can aid a project rather than as an independent, vibrant design activity[6].

The only exceptions to this type of approach are the ceramics workshop for students on the specialist degree course at IUAV in Venice and the teaching set-up at the Free University of Bozen-Bolzano, which is structured around "projects" and separate workshops for different materials (with a system similar to the Bauhaus teaching approach). Nonetheless, experimentation with materials is somewhat rare and it is left to the free choice of the students or the teacher who chooses the subjects for projects.

This organizational system for teaching with a purely theoretical and technical approach to materials does not reflect the rich heritage of the typically Italian design method.

In order to complete the overview, it is necessary to add some details about the characteristics of Italian didactics.

Design teaching in Italy is something that developed recently. It was only around the mid-1990s that the national university system began to organize educational programmes in this specific area. There was a great innovative drive behind it and – thanks to the new degree structures that were freed of the traditional disciplinary rigidity, in which architecture was taught solely by architects, engineering solely by engineers and so on – it brought together a huge variety of fields and areas of knowledge, ranging from anthropology to semiotics and from economics to chemical engineering.

Degree courses in design tend to develop in architecture faculties. It is necessary to use skills that are already present in the places of learning, so teaching about materials has involved the natural transposition of courses on architectural technology or process and chemical engineering, albeit with the small adjustments required. This explains the approach taken by materials courses, with their traditional and exclusively theoretical teaching based mainly on the study of the mechanical behaviour of traditional materials and certain construction techniques. This shows that the teaching system is behind the times and that the educational activities do not cater to the real needs of contemporary production and research.

Only recently (in the last six years or so) have specialist design skills begun to be used in PhDs in the specific sphere of the relationship between design and materials, joining those of a technical and scientific nature. The presence of these new skills is leading to changes in study programmes, with trials of a new approach to technology teaching taking place.

5. THE STATE OF THE ART OF ITALIAN MATERIALS RESEARCH AND TEACHING

From the early years of the 21st century, there has been a burst of fresh interest from the

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[6] In this respect, it is important to underline that discussion of ad hoc material design was already taking place in the late 1980s (Manzini, 1986b).

Italian design culture in innovation with materials with regard to design activities and the ability for technical innovation to encompass design input and new qualities for future products. Technology and the sciences are expanding rapidly and new challenges are opening up. There is a pressing need to develop new teaching methods so as to allow comprehension and embracement of technical changes. They must provide an important critical capacity for designers, who must deal with technological innovation every day and present it in a way that aids the users to exploit it.

How can students be taught how to use materials properly? Which aspects must teachers take into consideration? Should they continue to focus exclusively on theoretical and technical matters and control for optimum use of the potential offered to designers by materials? We believe that a purely technical and control-based outlook is not appropriate in the field of design. It is absolutely necessary to take into account the designer's need to combine technical and production matters with design-related elements for aesthetic experimentation on at least three levels: the level of perception, which reassesses the relationship of the senses during genuine experiences of things; the level of meanings, which emphasizes the importance of the cultural (artistic and conceptual) side of the relationship with technology; and the level of creativity, which uses the imagination to innovate and open up different scenarios compared to the past.

In the field of PhDs, design research has looked into the skills to be used, the abilities to be developed, and the approaches to be taken when teaching about the use of technology. An important contribution was made to this area of research by Mike Ashby, a professor from the Engineering Department at Cambridge University (Ashby, 2002). He published a book that acknowledged the skill of designers in selecting materials to give products their own character, which is just as essential for the success of a project as consideration of the functional aspects. Ashby's book also underlines the need to find a means of joint communication between engineers and designers. The two categories of figures are so different that they take different approaches, which complement each other.

The early 21st century also saw the completion of a number of studies proposing theories and methods for the interpretation of the silent heritage of technical and cultural information found in design products, with the objective of comprehending them and developing teaching methods.

In 2003, Marinella Ferrara[7] (Ferrara, 2003; Ferrara, 2005) looked into the evolution of design paradigms as techniques and materials developed. She studied the history of design and explored the connection between technology and social aspirations as a driver of innovation in industrial products. For each of the three phases, she identified the successive technology and material paradigms that influenced the choices regarding meaning and design

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[7] Ferrara's work was initially carried out as a dissertation for her design research PhD at the Design Department of the University of Palermo (1999-2002), then revised and published in the two volumes mentioned above.

language. Ferrara used short profiles of objects to illustrate her views, utilizing them as a common thread to give an understanding of the profound, complex economic and cultural implications of designers' technological choices. In this way, she created a method for teaching about materials that encompasses history, technological knowledge and design.

Meanwhile, a number of research projects looked into materials as elements of the design language, means of expression and catalysts for experiences. The objective of these research schemes is to satisfy the need to develop a teaching method that encourages observation and guides the selection of materials in the design process so that it is no longer solely based on knowledge of technical properties but also on awareness of soft - i.e. sensory - qualities of materials, and therefore on perception. Some of the projects aim to lay down new criteria for the creation of materials libraries for teaching purposes, which are essential for direct evaluation of materials and characteristics which can be perceived through sensory experiences[8].

From 2000 to 2003, Sabrina Lucibello carried out research with the Crossmodal Psychological Centre at the University of Oxford, which proposes a method to allow objective perception of the main qualities of materials (Lucibello, 2005). This method uses the five senses to assess material, which is the first, most direct interface between people and objects. It is based on a diagram with Keywords for the senses, each of which expresses a major characteristic of the material. The combination of the different characteristics can be used to guide the selection of the materials during the design process.

Valentina Rognoli and Marinella Levi have also investigated the expressive and sensory side of materials (Rognoli and Levi, 2005; Rognoli and Levi, 2011a). As a teaching resource, they propose a sort of Atlas for the interpretation and management of some of the perceptive and sensory aspects of materials, which can be converted into engineering data. Their goal is to raise awareness among future designers of the main qualities of the materials (Karan, 2010).

Recently, Beatrice Lerma, Claudia De Giorgi and Cristina Allione (Lerma et al, 2011) have developed an assessment method for the sensory properties and environmental friendliness of materials, using a multi-criteria model and taking into account the different cultural contexts. The method uses the Sensotact® - SounBe®, Eye-tracking, Sensotact® and Gloss Scale tools to "measure" the sensory qualities of materials that enhance the use of

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[8] The working materials libraries are: MaterialieDesign (1999) at the Politecnico di Milano, a physical and digital research centre that supports teaching about materials for design; ArTec at IUAV in Venice, an archive of techniques and materials for architecture and industrial design with samples of materials and models of technical components and parts for architecture projects and multimedia tools about Italian and European constructions; MATto (2004) at the Politecnico di Torino, an archive with more than 500 samples of materials and a training and research centre that focuses in particular on environmental friendliness and the expressive potential and sensory properties of materials. Other noteworthy schemes include: Material Design (2008), a material encyclopaedia and research workshop at the Architecture Faculty in Ferrara, with a special focus on stone materials; the Interdepartmental Design Centre (2011) at the Free University of Bozen-Bolzano, which was originally created as a computerized database and teaching room that aims to establish connections between technical, production and design information regarding old and contemporary objects.

products and aims to serve as a guide for the management of environmental sustainability aspects of products.

The growing complexity of the world of materials is however altering the role of the designer and leading to an increase in the numerous different professional and research activities that revolve around the relationship between materials and design. These aspects have been examined by a number of studies (Raimondo, 2004; Ferrara and Lucibello, 2009) that highlight shared ground between the various fields and sectors that conduct research into materials, using both deductive and inductive approaches and asserting that a multidisciplinary system is now necessary for scientific and applied research.

The broadening scenario of materials for design has been investigated and described by several research projects that focus on new categories of materials, i.e. smart materials (Cardillo and Ferrara, 2008), and "new material landscapes" (Langella, 2003).

Another emerging area of research is "bio-inspired" design. Its unprecedented combinations of design and biology form "hybrid" materials with new properties and capacities that cannot be classified with a material identity in the traditional sense. Carla Langella[9] (Langella, 2007) analysed some of the possibilities that have been opened up for design thanks to the development of biological knowledge, which is combined with computer technology in an effort to design "new tangible and intangible products that conceptually and concretely reflect some of the qualities found in the natural world." Giuseppe Salvia, Valentina Rognoli and Marinella Levi (Salvia et al, 2009; Rognoli and Levi 2011b) analysed the potential of the biomimetic approach and focused in particular on the publication and knowledge-sharing tools (such as blogs, specialist reviews and databases) that aim to provide support for designers in the forthcoming biomorphic era. The topic was also the specific focus of an issue of the magazine DIID (Lucibello, 2009), which concentrated on the enormous potential for design today, which can use nanotechnology not only to influence the form and function of products but also to establish the very DNA of the materials that will be used to make them. This is a very hot topic, as demonstrated by the fact that IUAV has set up a Nano design research group for design PhDs which uses the analytical and creative tools from the field to explore the applications of research in the field of nanotechnology. At the same time, it carries out experimental research into potentially significant applications in order to guide basic research into nanotechnology. This activity outlines the different forms of relationships between technological innovation and product innovation.

This "critical mass" of research shows just how great the focus is on the topic of materials and knowledge of them through the specific design culture. There is a huge variety of approaches, teaching tools, experiences and complementary activities which have become

[9]The name "Hybrid Design" comes from a new type of synthetic materials which are made in laboratories by combining nanotechnology with the procedures and principles of molecular biology.

part and are continuing to establish themselves in the educational programmes for future designers.

6. REFLECTIONS ON THE ITALIAN AND INTERNATIONAL APPROACHES TO TEACHING ABOUT TECHNOLOGY IN THE CONTEMPORARY WORLD

A comparative examination of some interesting international experiences played a key role in the critical thinking behind the new teaching method for design materials that is presented here.

In some of the most renowned design schools in Northern Europe, there is an experimental approach to the use of materials which centres on practical experience.

One significant example is the Design Academy in Eindhoven, which is recognized as one of the most authoritative schools and promotes the development of independent judgement and a creative mentality in students. Teaching is not seen so much as training about the design process itself, but more as a form of "guidance" of the student's personality through provision of the knowledge and "abilities" necessary to carry out the design process, which in turn is seen as the capacity to organize design research independently.

In particular, in the Atelier – which is one of the departments for specialization studies after the basic course – students consciously develop their intuition and outlook on design through a personal method. It starts with observation, creative drive and manual work, and encourages the search for new meanings for materials, forms, abilities and contexts. The Lab is another specialization department and a place where students carry out their methodical research. Here, in-depth experiments take place. Students are encouraged to take an analytical approach and develop their abstract thought. Each student uses a personal research method to carry out experiments. It can be scientific as well as intuitive, but it must always be recorded so as to ensure that it can be repeated. New materials and techniques are tested and pushed to the limit of their capabilities, as the students go beyond the boundaries of current knowledge.

The students of the Design Academy in Eindhoven have shown their ability to move away from the traditional approach to design. They have put together interesting concepts and technical innovations for processes and independently developed their own projects. However, independent working of this kind does not exclude the ability to interact with companies. Instead, it involves development of the capacity to give a powerful, important innovative and creative boost to companies in terms of production, with creative promotion of innovative products.

Riccardo Blumer was behind some other interesting teaching schemes in 2007, as part of the Industrial Design Degree at the University of the Republic of San Marino. They involved reassessment of manual work, such as experimentation with static load-bearing structures. The method employed focused on practical experimentation and moving food materials to new settings. It proposed taking a step back and going from the artificial to

the natural in order to gain a better understanding of artificial elements (thus going against those who claim that newness and research are only possible through the discovery of new materials). With observation and practice, the students showed that it was possible to make small items of furniture (such as chairs, stools and hammocks) that were capable of supporting the weight of a person (the teacher himself) using nothing but foodstuffs. As they said, "compressed puffed rice is similar to polystyrene, fish glue reinforced with strips of liquorice root is comparable to any carbon fibre/epoxy composite, and dry bread spread with animal glue is akin to a plastic box" (Blumer, 2007). The course taught students a method for experimentation with forms at the limits of technical and aesthetic efficiency, in the relationship between materials and geometric structures.

These teaching experiences place the focus back on the creative approach used when teaching about technique.

It was also necessary to reflect on the consideration by teaching of emerging socio-economic tension: the effects of globalization and relocating production, automation of processes, the global economic and employment crisis, the new phenomena in professional practice, such as independent production, and the issues faced by a high-income society like Europe.

A response to these matters will be given by teaching choices in the near future. Renewed interest has already been taken in the possibility of rediscovering "craft know-how", as well as in practical experience and individual entrepreneurialism. There are frequent mentions of the combination of a technical and theoretical approach and practical, experimental methods that encourage creativity, as well as the ability to thrive in multidisciplinary and communicative spheres.

Teaching is thus faced with two problematic issues: one of an *epistemological* nature and one of a *pedagogical* nature.

The first of the two concerns the foundations of design teaching. The Bauhaus approach is still considered a sound reference model. In this system, the teaching was based on a blend of practice and theory, and it was led by two masters: one craft worker and one artist.

As Gropius explained, "it was necessary to have two different groups of teachers because it was not possible to find anyone suitable to lead the workshops: the artists did not have sufficient technical skills and the craftsmen did not have enough imagination for artistic matters" (Gropius, 1955). The guiding principle was to use craftsmanship not as a romantic ideal but as a didactic means to train modern designers. There is no contrast between practical craft skills and industrial design work. Indeed, they can aid understanding of materials. Going back to the basics, Bruno Munari believed that handling and construction experiences involving a variety of materials can develop the imagination in a logical process that requires inquisitiveness, attention, and the ability to act sensorily and give meaning to sensations. A system of this kind often offers encouragement to challenge technical conventions and move beyond existing rules, leading to the creation of new languages.

Alvar Aalto worked in a similar manner. When recording his experiments with curves in wood, he spoke of "abstract" trials with materials:

> "At the exhibition in London, we showed an aspect of our work for the first time: abstract experiments with wood processing. These experiments should more or less be seen as games with materials and technical, formal trials with any immediate practical goals. We believe that a rational road that leads directly to a practical aim is a negative thing for architects, as it can easily bring about formal mechanisms and vulgar rationalism" (Blaser, 1981).

The origins of the natural creativity of Italian design lie in the material culture of the country's past, with its art and craftsmanship. It involves *homo faber*, who develops creative thoughts in his manual work, in an invention process that starts with sensory stimulation and results in parallel processing by the brain of visual, acoustic, tactile and symbolic/linguistic information.

The second, pedagogical issue concerns the need to go beyond the organization of knowledge, which is still "split" into disciplines and needs to be rearranged in what could be called a *multiverse* way, which is capable of embracing the many sides of the profession and the skills required. The goal of higher education must be to "learn to learn" and "learn to be". Furthermore, didactic methods which aim to develop creativity must be adopted, in an overhaul involving a number of significant changes. These are:

a. From products to processes.

b. From problem solving to lateral thinking.

c. From definitions to the search for horizons of meaning.

d. From knowledge of theories to the construction of hypotheses in a communicative context.

e. From the idea of sequential causality between teaching and learning to a systematic vision in which teaching and learning may be asymmetrical and asynchronous.

f. From the linear sequentiality of educational acts to the promotion of holism and contextualization, so as to keep all of the doors of learning (different languages, different styles of thinking) open in a genuinely multimedia environment that encourages dialogue.

7. DIDACTIC METHOD

There are a lot of sides to the study of materials (from science and materials engineering skills to specific design skills) and it also covers a number of fields of research (from functional and performance qualities to perceptive and sensory properties) and requires various capabilities (from appropriate use of materials to the *ability to innovate* by developing personal methods and visions of materials).

Consequently, there must also be numerous, complex teaching systems (from a *theoretical and analytical* approach to a *practical* and *experimental* one) with the goal of minimizing the

gap between theory and practice and developing the analytical, design and communication skills of a figure that spans the areas of design and knows about materials but is also able to work with the metalanguages that bring together in a network disciplines and production know-how in the area of meta-products and semi-finished goods. Continual interaction between the ability to think and technical and creative activities leads to the development of technological skills (Kimbell, 1996).

The activities and objectives of practical experimentation can be summed up as follows:

1. Observe, analyse and understand.
2. Explore to start up creative processes.
3. Experiment, record and document in order to acquire a scientific method.

If a programme is to develop these complex skills, it must introduce more technical, laboratory subjects so as to enhance understanding of the primary elements in this area of knowledge. There must be design courses for experimentation with design methods for different areas and theoretical courses that comprehend and implement the languages of the complex material design network.

The teaching strategies must also aim to hybridize the traditional processes for materials with the more experimental procedures of architecture, design, engineering, communication, digital art and decoration. A key role must be played by exercises that seek to introduce opportunities for inductive learning in teaching of design with deductive foundations.

These views are behind the exercises for courses on materials for design that have been put together by the author over 6 years of teaching on Product Design Degree Courses (at the Politecnico di Milano, ISIA in Florence, Sapienza in Rome, and the University of Palermo), which introduce opportunities for inductive learning in teaching of design with deductive foundations.

There are five phases in the didactic method, along with a subsequent phase for the Specialization Degree course to develop planning and experimental thinking for the design of materials. These phases are:

1. Exercises to provide knowledge of the aesthetic and sensory qualities of materials. They involve observation and evaluation of the sensory characteristics of materials and practical, manual action to experiment with the modelling and characterization potential of materials without any practical purposes (taking the lead from A. Aalto's experiments with wood). *The students from the first year of the Product Design Degree Course did the exercises and the experimentation was introduced as part of didactic activities in the Design Workshop. This didactic experiment was then fine-tuned on the Technology course of the second year of the Design Degree at ISIA in Florence, with the introduction of scientific practice, precise documentation of the work done with materials and assessment of the results.*

FIG.1. SENSORIALITÀ (POLITECNICO OF MILAN, STUDENT'S EXERCISES); TEXTURE (ISIA OF FLORENCE, STUDENT'S EXERCISES); TEXTURE RAME (ISIA FIRENZE, STUDENT'S EXERCISES).

2. Exercises to simulate and reproduce materials using alternative materials, so as to produce new visions of materials. The didactic experimentation was carried out on the first and second year materials courses at Sapienza University of Rome, with the use of food materials.


FIG.2. NATURAL MATERIALS (SAPIENZA UNIVERSITY OF ROMA, STUDENT'S EXERCISES. INSPIRATION: RICCARDO BLUMER 'S UNIVERSITY OF SAN MARINO COURSE).

3. Practical exercises to explore the physical and chemical properties of materials and develop possible new capabilities, going beyond conventional applications and using materials on the boundaries of their possibilities. The experimentation was carried out using ceramic materials as part of the Materials for Design course on the second year of the Industrial Design Degree at the University of Palermo.

FIG.3. TERRA CRUDA (UNIVERSITY OF PALERMO, STUDENT'S EXERCISES).

4. "Design follows Materials" workshops, which involve starting with materials and designing simple products that bring out the characteristics of materials and experiment with new expressive languages, assessing the potential in the usability of the products.

FIG.4. EROSIA PROJECT ("PROFONDA CERAMICA", POLITECNICO OF MILAN, WORKSHOP).

5.Independent construction exercises in the design workshops, through experimentation with processes to introduce small forms of innovation and documentation to ensure that the process can be repeated.

FIG.5. THE PRACTICAL METHOD ALLOWS STUDENTS TO EXPLORE FOR KNOWLEDGE AND TO START UP CREATION, DESIGN AND PRODUCTION PROCESSES.

6. For Specialization Degree Courses) Designing new materials in a multi-disciplinary sphere. This is the terrain on which teaching about materials for design will have to operate in the future. This method could mark the shift from teaching about materials for design to teaching material design.

FIG.6 THE PRACTICAL METHOD ALLOWS STUDENTS TO EXPLORE FOR KNOWLEDGE AND TO START UP CREATION, DESIGN AND PRODUCTION PROCESSES.

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INTERNATIONALLY DISTRIBUTED TRANSDISCIPLINARY DESIGN EDUCATION. SUCCESS FACTORS AND PITFALLS

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The efficacy of project-based learning in design education has gained broad acceptance. Some innovative design curricula also recognize the significance of trans-disciplinary practice, and organize student teams such that different functions associated with key disciplines of design projects are represented.

Project Oriented Learning Environment (POLE) is one such educational paradigm (Holliger & Kündig, 2003) (Eris et al, 2005). The publication describes the POLE platform and presents key success factors as well as the pitfalls experienced in distributed trans-disciplinary project-based design education.

POLE is a learning system developed by a network of 16 international universities; it operates within a reflexive context, taking into account the various cultures involved. Since 2001, 20 one-semester projects, all originating from and funded by industry, have been completed using the platform.

This publication includes details of process design and project outcomes through the description of a case study. It also presents the findings with regard to how this trans-disciplinary and multicultural learning environment challenges students and professors as well in the development of new and promising collaborative academic structures.

••• Design education, project-based learning, trans-disciplinary, cooperation •••

PROJECT BASED LEARNING

Project-based learning is a methodology that has gained broad acceptance in design education. Moreover, when project-based learning is performed in teams, it resembles professional design practice more closely, and offers an attractive value proposition to educational institutions for producing highly employable graduates (Dym, C., et al, 2005) (Freire, P. 1985). There have been very few consistent attempts at recruiting students who actually belong to different educational disciplines so that a true trans-disciplinary set-up is achieved.

The exposition of students into a project environment forces them to assume roles close to their future profession; they can apply previously acquired knowledge and they also develop new knowledge from the project experience. In this role of application of knowledge, the expertise that each student has developed according to his academic specialty is tested when faced with more complex problems (Thakara, J. 2006) to be solved at the interface between their disciplines and other specialties. In many cases they discover that the best way to solve a complex project is to tackle it as a team – and most promisingly as a trans-disciplinary team. A trans-disciplinary view that is not focused only on how students recognize and act according to their area of study, but an attitude that acknowledges other areas, too, and that is able to transgress disciplinary boundaries, producing the quality that makes teams successful.

QUALIFICATIONS OF SUCCESSFUL GRADUATES

In the trans-disciplinary project environments it is increasingly necessary to develop "soft skills" that enable students to assume social roles to coexist as a team, to take on leadership roles, and develop empathy and respect for the other team members. This quality is crucial in today's new environments in international business, where the coexistence of different cultures is a major challenge. This fact requires new educational models to help students develop their disciplinary and soft skills in parallel. The University of Applied Sciences Northwestern Switzerland as leading house of the project platform POLE has defined the following qualifications as mandatory for successful graduates:

Trans-Disciplinarity
• Disciplinary Competences
• Social Competence
• Competence for Implementation
• Awareness of One's Own Limitations
• Respect for Other Disciplines
• Familiarity with and Respect for Cultural Differences

Sustainability
• Ethical Thinking and Acting
• Responsibility for Future Generations

According to these definitions, proactive universities aim at developing innovative cur-riicula based on the foundations of trans-disciplinarity in multicultural environments.

POLE PLATFORM

Founded in 2001, the Project Oriented Learning Environment POLE is a study platform to be used by students and professors of international universities with the goal to network ones own subject with other professions and to work together across cultural and language borders (POLE project, 2011). Based on a socio-constructivist approach, the POLE environment promotes the acquisition of knowledge on the basis of users' experience and via shared activities in a collaborative environment (Holliger, C., 2006).

POLE currently has a network of 16 partner universities that participate with teachers and students in the projects. These are: University of Applied Sciences Northwestern Switzerland, Tecnológico de Monterrey, Aalborg University, Universitat Politécnica de Catalunya, Technical University of Delft, Stanford University, University of Strathclyde Glasgow, Norwegian University of Science and Technology, Windesheim University, Zwolle, École Polytechnique Fédérale de Lausanne, Helsinki University of Technology, Bauhaus Universität Weimar, Swiss Federal Institute of Technology Zürich, Franklin W. Olin College of Engineering, Brno University of Technology and Tongji University, Shanghai.

During the past 10 years, the platform has enabled the development of 20 semester projects, listed below, with its topics and industry partners (POLE project, 2011):

2000-2001: AEC Courses with Stanford University
2002: Campus Planning incl. Faculty Club
2003: Urban Planning Brugg/Windisch; Architecture and the Body
2004: Snow Dive®; Peak of Relaxation (Adelboden)
2005: Vertical Classroom; CanPlus (Nestlé)
2006: Urban Planning for Davos; SmartLight (Stryker, USA)
2007: X-Frame (Collano)
2008: Sun&Shade (Schenker); Human Centred Medicine (Hospital Affoltern)
2009: DrivenDriver (Volkswagen, D); The Kitchen (Chong-Ming Island, Shanghai)
2010: HighLight (Mammut Sports Group); 50m for Basel (Sports Facility)
2011: Air (Elica); 7x24x52 - Water & Ice (Urban Planning Concepts for Bern)

ACADEMIC STRUCTURE

The structure created for projects in all the above cases have an international approach with participation of students from the different universities that belong to the platform and are integrated into teams that mix the different nationalities/cultures they come from. In addition, POLE seeks to have different disciplines for the formation of trans-disciplinary teams ranging from engineering program such as computer sciences, mechatronics, systems engineering and electronics, to process management, material sciences, industrial design and architecture, as well as social and health sciences students. The universities actively participate with teachers who work as coaches throughout the project. And finally, and most importantly, the industry mentors are involved during the entire process.
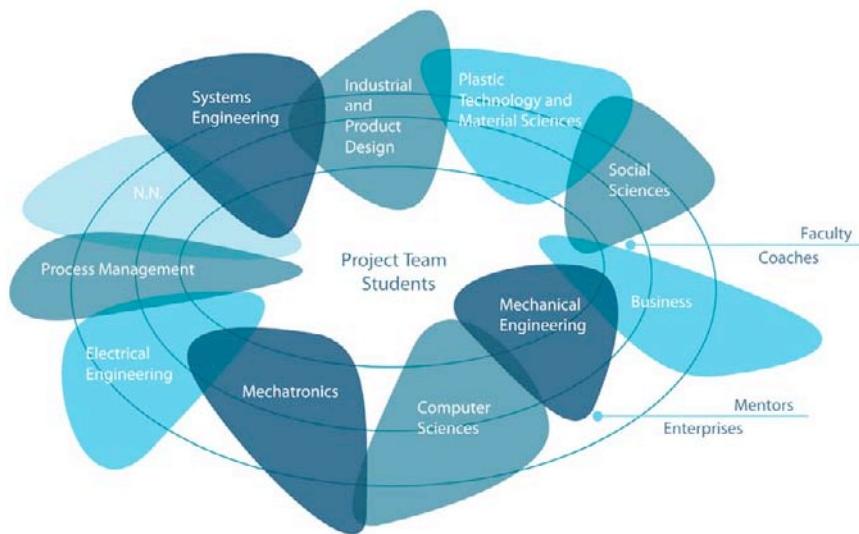

FIG. 1. ACADEMIC STRUCTURE OF POLE.

It is an important goal of all POLE projects to offer the participants a major challenge of innovation: e.g. the design and development of new concepts of process, technologies, services and products, all of this supported by an industry partner who co-develops the project and delegates the mentors who support the students during the entire process until the final presentation of the deliverables to the faculty and an internationally composed jury.

FIG. 2. KEY ELEMENTS OF POLE FOR DESIGN INNOVATION.

POLE ICT INFRASTRUCTURE

Due to the fact that after the kick-off week the student teams work from distributed locations, a reliable information and collaboration infrastructure is necessary. POLE teams use traditional e-mail and phone and for video conferencing Skype and Scopia. The contributions of the students are stored on a Wuala data base which provides that the plans are always up-dated and synchronized and, thus, guaranteeing that there are no meandering files floating around on individual computers.

PLANNING OF THE PROJECT

Once a partner company has been found which is seeking a solution for an initial project idea that is complex enough to necessitate the participation of different disciplines, a core group of faculty members from the POLE university network co-defines the project task. This task always is a rather open one in order to leave enough freedom for the students to ideate for new concepts, but still is specific enough to guide all the teams in a similar direction. POLE believes that the results are improving in quality when the teams work towards a common goal and share their preliminary results at the two intermediary review sessions. This means in other words that "stealing" ideas from colleagues' teams for the future work is not only allowed but invited. The core group also defines the deliverables that can be expected at the end of the project. This always contains a physical prototype - often in two versions: one being a design prototype, the other a functional one -, and a project documentation which also includes a chapter on the team's trans-disciplinary process as a mandatory element.

STRUCTURE OF POLE COURSES

Depending on the task, students from a subset of the mentioned partner universities are selected to attract the appropriate graduate (or last year undergraduate) students for the project. Based on a Curriculum Vitae and a letter of motivation the most qualified students are selected. In an elaborate process respecting disciplinary proficiency, cultural background, gender and personality (assessed by Jungian typology) they are then put together in 6 teams (with five to six students each) in the most heterogeneous way possible. The second main pillar of the project is formed by a group of approximately 5 to 10 academic coaches who not only take responsibility for the local disciplinary guidance of their own students, but are also accessible during the entire project for all participants. Finally, and most importantly, the outermost circle in Figure 1 visualizes the integration of the industry partners who have to commit themselves to actively participate as a mentor in the design process. POLE courses generally last for one academic semester. Originally, they used to start with a physical kick-off week at the site of the industry partner. However, this experience has shown, that the students were usually overwhelmed and could not react appropriately to the inputs received. Therefore, the new structure initiates the project with a virtual kick-off session by video conference in which the students and their coaches introduce themselves, get to know a rough introduction into the task and are asked to start a local disciplinary analysis and research phase. After two weeks the students then physically come together for team building and trust building exercises. The new scheme has shown to be very successful in so far as the students arrive prepared and already full of questions for the coaching faculty and the industry partner. The main task during the kick-off phase is to define a meaningful process planning per team with a shared goal statement and milestones as a


FIG. 3. TIME STRUCTURE OF POLE COURSES.

deliverable. This physical gathering has proven to be eminently valuable because it is this phase that creates the "glue" and the commitment to be able to work together afterwards in a distributed fashion using video conferencing tools.

After the physical kick-off the students work from their home universities coached by the local faculty experts. This first phase of distributed work usually is a challenge because the difference of working by video conferencing systems rather than at the same table is often felt as less constructive. In addition, often problems arise due to a lacking integration of individual team members, working habits that are culturally different, non-declared other obligations in school, poor response of participants etcetera. The presence of a reliable coach at each location is essential during this phase of the project.

At two review sessions during which all the teams, all the faculty coaches and representatives of the industry partner are present, the teams present their preliminary results and get critique and encouragement. The deliverables are pre-defined to give the students a clear picture of the expectations and requirements. The teams are qualified by their performance as a team, the depth of its concepts, i.e. how well the proposed solution takes the stakeholder into account, if ecological and economic aspects were respected and if a trans-disciplinary co-operation had taken place.

Finally, the entire POLE crew gets together physically again for the final presentations. The students get feedbacks from their coaches, the industry partner and from an independent jury of experts.

ASSESSMENT AND FINDINGS

The assessment methodology that was used to monitor key aspects of student experience relied on ethnographic observations, interviews held with students as well as instructors throughout the course and two surveys administered two weeks into the project and four weeks after the project's end.

The survey data suggest the following findings:

- Throughout the course, students appreciated the trans-disciplinary and international nature of teamwork.
- Students' appreciation of the realistic nature of projects was an attractor before applying for the course but increased after the project ended.
- The co-located kick-off week is of central importance to the performance of distributed design teams.
- The virtual kick-off adds to the motivation and brings the students already prepared to the physical kick-off.
- The continuous involvement of the industry partner is essential for the motivation of the students.

CASE STUDY: PROJECT AIR

In 2010 Elica was the industry partner of the POLE project named AIR. Elica is the worldwide leader in domestic kitchen hoods production and it is recognized as a pioneer in air purification appliances. Its capability to innovate through technical improvements, applied research and design studies is the key to maintain its global leading role. Elica is committed to confirm this position and to expand through innovative ideas and the development of novel technologies for everyday's air quality improvements. Elica has its headquarters in Fabriano, Italy, with branches in India, Poland, China and México. In 2010 the university partner at Tecnológico de Monterrey, Campus Guadalajara, took a leading role in the organization of the project and invited all the faculty and student teams to México. This made a visit at the production facilities of Elica in Querétaro possible. The visit to the company generated high expectations and motivation with the students. After the visit there was a working session featuring the company´s processes, product families and completed with a comprehensive discussion on technical details, traditionally used parts and an open session in which next to marketing knowledge about Northern and Southern America also aspects of confidentiality were addressed. With this possibility to get the students, the faculty members together with the industry mentors proved to be an invaluable motivator for the entire project.

Project Task

Air is the element that makes life possible; air is precious. These days, a lot is said or written about pollution, smog, dust; everybody's life is threatened by them and health and wellness are no more neglected issues or challenges that can be postponed in politicians' agendas. Therefore, air quality has become a priority for the future of all of us. Elica, therefore, asked the POLE teams to conceive and then design new multifunctional products, new purifying and aspiring systems, new technologies to improve air quality, and as a consequence, to improve health, wellbeing and ⁄ more generally speaking ⁄ quality of life. Elica was also seeking for a method by which air could optionally be enriched by fragrances, eliminating bacteria or pollen, and at the same time be a source of relaxation e.g. by special lighting (chromotherapy). The underlying technology should be qualified by low noise levels. The products had to be primarily conceived for domestic the environment, but the teams had to investigate a scale⁄up for big public spaces like fumoirs, airports, etcetera as well. The new products had to be ergonomic, easy to install, easy to use and, naturally, had to impress by an appealing design and low⁄energy consumption.

With these multi⁄facetted purposes, it is clear why such an endeavour could only be tack⁄led by trans⁄disciplinary teams, consisting of product and industrial designers, material scientists, mechanical and electrical engineers, physicians, experts in fluid dynamics and aerodynamics, systems and mechatronic engineers as well as coordinating business engi⁄neers. Only a trans⁄disciplinary discourse could allow for meaningful solutions. In other

words, Elica's proposal was best suited for the POLE project AIR.

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DESIGNING THROUGH LAYERED ARCHI-CINE SECTIONS.
SECTIONAL MONTAGES

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This study aims to develop a representation and designing technique involving the complicated conditions of today's metropolis and supporting the design ability of the architecture student, and to look for the same competency in the field of architecture. Within this direction, it brings the contextual ⁄ critical⁄cultural ⁄ background of city and imaginative ⁄ critical⁄creative ⁄ faculties of the designer together. Therefore, working on the border⁄lines of the city referring to critical sections, heterogeneous structures of metropolis and designing through archi⁄cine sections referring to critical representation techniques of cinematography and architecture appear as the driving concepts of the approach. These concepts⁄infrastructures of the approach give the possibility to get involved, understand, unfold and display the critical conditions of the city and to provoke the imaginative faculties and dreams of the designer. This article discusses the representational aspect of the architectural design approach. Briefly, archi⁄cine sections or sectional montages is discussed with their theoretical background and applications at the architectural design studio.

••• Cinematographic montage, architectural section, architectural representation and design, urban reading, design studio •••

INTRODUCTION

The aim of the study is to look for tools and techniques for developing representation and design ability of architecture student, and look for the same competency in the field of architecture. Forcing reason for doing such a research, however, is getting complicated conditions of today's cities and difficulty to read them as the main domain of architecture⁄apart from looking for the creativity in design.

The study brings contextual, 'critical⁄cultural' background of the city and imaginative 'critical⁄creative' faculties of the designer together, which are the essential entities of designing and archi⁄tecture⁄as places of new temporality and spatiality. Working on the 'border⁄lines' of the city re⁄ferring critical sections, heterogeneous structures of metropolis and designing through archi⁄cine

sections referring critical representation techniques of cinematography and architecture appear as the driving concepts of the approach. Therefore, it is applied to cinematographic montage and architectural-section together with critical-cultural attitude as conceptual and representative tools in this approach; and it is called as "designing through layered archi-cine sections or sectional-montages." Expectation from this approach are to get involved, understand, unfold and display the critical conditions of the city and to provoke the imaginative faculties, dreams of designer-by bringing different attitudes, tools and techniques together.

'Layered' arch-cine sections or sectional-montages, within this contend, mean to overlapping and/or moving images/drawings (plans and sections, films and animations, and modals) criti-cally disclosing, representing and projecting complex-getting more complicated-city structures! These layered arch-cine sections provide a spatial and temporal medium to understand and rep-resent the critical-cultural conditions of urban structures and to reveal their architectural-interven-tions. This medium allows to bring spatial and temporal, now and then, existing and imagina-tive, visible and invisible, problematic and projective, physical and virtual together. This article will bring and discuss this montage based representation and design approach with its theoretical background and applications at the architectural design studio-processes and projects.

BACKGROUND[1]

Complex City Structure. City/metropolis, as the main domain of today's life, inhabits complex-multi-layered-structures. It carries all kinds of different spatial, temporal and life actions; sections, scales and dimensions. It contains existing, emerging… new modes of perception, conception, and representation. It is the core place of all kinds of discussions, thinking, criticism, designing and practicing architecture, technology, ecology, economy and politics… It is the core place of architectural design and design studio. [Within these features, it is the place of third space]
Critical-Cultural Attitude. It is an unavoidable approach to read and understand cities and urban life: Critical attitude directs people asking questions; calls for a dialogue; creates du-ration; mediates communication in between people and different parties. It calls the reality and forces for its transformations... Cultural Approach is a situational attitude: It calls both factuality and empathy; helps recognition and understanding the others… It gives an opportunity for analyzing history as the practice of deconstructing and reconstructing relations (contexts, effects, etc.)[2]. Therefore, it is the way of conceptual and contextual understanding of space-time-life interactions, especially in cities. [Within these features, it

[1] Some of the related publications about background written by the author are the followings:
Senturer, A. 2004. Mimarlıkta Elestirel Yaklasim, [Critical Approach in Architecture]. Istanbul: Yapı Y.
Senturer, A. 2006. Critical-Cultural & Cinematographic 'City' Conceptions in Architectural Design. In *Design and Cinema: Form Follows Film*, B. Uluoglu, A. Enisci, at. al. eds. Cambridge: Cambridge Scholars, 292-304.
Senturer, A. 2008. Zaman ve Mekanın Genisleme Araligi Olarak 'Sınır-Boyları' [Border-lines as the Expansion Inter-vals of Time & Space]. in Zaman-Mekan, A. Senturer, S. Ural, at. al. eds. Istanbul: YEM Yayın, pp.186-203.
[2] [Grossberg, L. 1994. Introduction: Bringing it All Back Home-Pedagogy and Cultural Studies. in Between Borders, H.A. Giroux and P. Mclaren eds., New York and London: Routledge, p.5-9; in Senturer, A. 2004].

is the way to the third space]

Border-Line. It is the place where differentiations, different densities, patterns and formations, different membranes and forms, different identities appear. It is the place in between different identities. It makes the surrounding conditions visible… It is a place of crashing and meeting; and often it is a place of crisis! Therefore, it forces the parties for having a dialogue and transformation… [Within these conditions, it is the place pregnant to the third space]

Cinematography/Montage. Cinematography is a durational, situational entity. It processes the process - through the montage. It is the land of montage… It is a tool, technique and theory for thinking the intervals, intersections, super-positions for revealing a critical insight, a strong theme and a creative concept, and it is a good archive. It is a very good critical tool and technique for recording, disclosing, and representing the city, urban life. It is a design approach processing the time, space, and movement, and thus perception and conception. That is the possibility of designing life, space, and time in interaction… [Within these potentials, it is the place opening/designing the third space, the third meaning]

(Architectural) Design Studio. It is the place of thinking on 'new' freely: It is a place of designing without having had a demand on it. It is the place of creativity and discovery: It is a critical place of seeking out, learning and projecting problems, potentials and possibilities of life. It is a place for developing ideas, techniques, and proposals especially concerning getting complex urban structures, existing and new modes of space-time-life interactions! [Within these potentials, it is the place opening/designing the third space].

MONTAGE AS A TOOL, TECHNIQUE, AND A THEORY IN ARCHITECTURAL DESIGN
Montage

Montage in general terms is a method of organizing and editing the visuals-scenes whose emotional impact and visual design are achieved through the editing together of many brief shots[3]. As an editing technique, it combines or separates frames to construct narratives, sense of continuity and discontinuity and juxtapositions; it may expand or contract time and/or space[4].

We, first time, came across with 'montage cinema' and 'montage theory' in S. M. Eisenstein's cinematography and in his cinema lessons. He talks about the techniques, methodology and theory of montage. (Eisenstein, 1928, 1938) (Tikka, 2008) Along with he refers to architecture interestingly as the first establisher of the montage theory.[5] He says that: (Eisenstein, 1938)

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[3] S Orpen, V. 2003. Film Editing the Art of the Expressive. London. Wallflower. p.126; in Essay_Montage. by M. Glenny. Visited in: 24 Dec 2011, web site: http://www.mrclement.com/jjj2/essay_montage.pdf.
[4] ibid.
[5] He studied architecture at the Institute of Civil Engineering, Petrograd after studying Arts in the School of Fine Arts, Riga. Visited in: 24 Dec 2011, web site: http://www.carleton.edu/curricular/MEDA/classes/media110/…

"Painting has remained incapable of fixing the total representation of a phe-nomenon in its full visual multidimensionality. (There have been number-less attempts to do this). Only the film camera has solved the problem of doing this on a flat surface, but its undoubted ancestor in this capability is-architecture. The Greeks have left us the most perfect examples of shot design, change of shot, and shot length (that is, the duration of a particular impression)... The Acropolis of Athens has an equal right to be called the perfect example of one of the most ancient films."

However, although Eisenstein underlines the role of architecture at the discovery of 'shot design' and even he was educated as an engineer and architect before being a film maker; he has been named as an avant-garde because of his cinematography based on his theory of montage.

The most striking point in his idea of montage is the notion of 'third thing', which is very similar to the idea of 'third space' underlined in the Background as complex city structures, critical-cultural approach, border-line, and the design studio[6]. Within this ap-proach, Eisenstein has been argued and pointed out that: "montage is an idea that derives from the collision between two shots that are independent of one another"[7]; and "it is dia-lectical where new ideas, emerge from the collision of the montage sequence and where the new emerging ideas are not innate in any of the images of the edited sequence, which then a new concept explodes into being."[8] Therefore, Eisenstein has believed that film montage could create ideas or have an impact beyond the individual images; two or more images edited together create a 'tertium quid' (third thing) that makes the whole greater than the sum of its individual parts. (Johnson, 2011)

Afterward, Eisenstein's discoveries on montage (theory, methodology and techniques of montage) have been followed and applied by many film makers, artists, architects and theorists, and then he has been called as a pioneering avant-garde, even the most important person in the field of cinema. Besides Eisenstein, another enormous contribution to the

[6] The place of dialectic and contextual approach in Eisenstein's cinematography, which was brought the idea of 'third thing', is underlined by some other academics. Dan Show is one of them and he indicates the dimension of Eisenstein's approach based in his seminal 1931 essay, 'A Dialectic Approach to Film Form.' That is: "... shot A is juxtaposed ... with shot B ... and the synthesis yields the symbolic meaning C ..." According to Show, "this technical innovation (which Eisenstein dubbed 'intellectual montage') resulted also from his studies of Kuleshov's famous experiments (which demonstrated that the meaning of any shot is contextual) and of Japanese ideograms (where two separate symbols can be juxtaposed to create a third meaning, e.g. child + mouth = scream, white bird + mouth = sing)." (Shaw, 2011).

[7] J. Lindop indicates that: This description seems to reverse the order in which the process actually unfolds in the specta-tor's mind; it is not so much that the additive effect of two separate terms produce a new concept so much as the a priori conventionally determined meaning gives special connotations to the terms which, taken as an aggregate, produce this meaning..., which appears in his three essays of Eisenstein composed in 1929: Beyond the Shot, The Dramaturgy of Film Form, and The Fourth Dimension in Cinema. (Lindop, 2007).

[8] En.wikipedia. Visited in: 24 Dec 2011: http://en.wikipedia.org/wiki/Soviet_montage_theory.

idea of cinematographic montage, in other words, to the idea of thinking, designing and representing through the montage, was done later by the French philosopher G. Deleuzé. His concepts of 'movement-image' and 'time-image' together with the notions of 'crystals of time' and 'power of false,' in which movement-image refers to 'organic regime' and time-image refers to 'crystal regime,' are the phenomena behind this principal contribution[9]. This conceptualization of movement and time is accepted here as one of the most crucial contributions to the idea of montage and montage related works (film studies, design studies, architecture, and philosophy).

Deleuzé basically re-conceptualizes, theorizes techniques of cinematographic montage found out before and after the World War II, which are the classic and the modern/new-wave cinemas. Deleuzé does do these conceptualizations and discussions especially over the views of Eisenstein and Bergson. H. Bergson, who is another famous French philosopher, is refereed as (one of) the first thinker(s) conceptualized the idea of 'duré' or 'becoming' and through that the idea of time, space and movement has been opened up. He has been also followed and cited by so many thinkers, film theorists, architects and designers; among them, we come across with the Deleuzian idea of movement, time and space.

Deleuzé explains montage from the Bergsonian terms of duration, he says that: "Montage is the 'determination of the whole' (the third Bergsonian level)[10] by means of continuities, cutting and false continuities. ... Montage is the operation which bears on the movement-images to release the whole from them that is the image of time." (Deleuzé, 1986) He, in that point, refers to the Eisenstein's theory of montage and keeps continue saying that: "Montage is the whole of the film, the idea, the 'third thing.' That is time can be considered as a whole, as an interval, or indirectly produced through montage." (Deleuzé, 1986) The movement-image is expanded from within as more montages images dilate the whole; this durational whole is expressive of 'the indirect image of time. … Then the function of montage is placing 'the (cinematographic) image into a relationship with the whole; that is, with time conceived as the open. In this way it gives an indirect image of time, simultaneously in the individual movement-image and in the whole of the film. ..." (Colman, 2011) The 'open wholeness' appears with the time-images of cinema! (Deleuzé, 1990) Therefore, it is possible to say that Deleuzé has expanded both the idea/theory of montage and the concept of time and space with his philosophical analysis on cinema and montage! Then 'time and space' has been freed from their conventional roots and older conceptions

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[9] J. Deleuzé's books: Cinema 1 and Cinema 2 (Deleuzé, 1986a, 1986b).

[10] "Bergson's third image is an elastic band being stretched. ... He warns us not to focus on the line but on the action which traces it. If we can focus on the action of tracing, then we can see that the movement — which is duration — is not only continuous and differentiating or heterogeneous, but also indivisible. We can always insert breaks into the spatial line that represents the motion, but the motion itself is indivisible. ... Now, the elastic band being stretched is a more exact image of duration. But, the image of the elastic is still, according to Bergson, incomplete. Why? Because, for him, no image can represent duration. An image is immobile, while duration is 'pure mobility' (The Creative Mind, 165)." Visited in: 13 April 2012: http://plato.stanford.edu/entries/bergson/.

(linear and sequential). This opens temporality and spatiality up to the free connections (of time-images). Meaning, too, is opened to the free and independent associations, interpretations. In other words, they are leaved into the 'power of false,' into the 'power of (jumping) montage!' After that it is moved from the linear conception of time and space to non-linear conceptions and formations, which makes possible to fold and unfold time and space, multiply the meaning and throw all into the future. The third space (the third thing, with the words of Eisenstein) is opened up that calles the new ways of re-presentation and design. Those are big discoveries and challenges for the spatial, fictional, representational/designing and architectural studies.

Eisenstein and Deleuzé could be called as two proponents of the montage theory but there are, certainly, some other people, great film directors such as D. Vertov, A. Hitchcock, L. Kurusawa, J-L Godard, A. Tarkovsky, M. Scorsese, whom were applied montage theory and developed new montage techniques. (see Fig.1 for some examples)

PICTURES FROM LEFT TO RIGHT:
1. EISENSTEIN, BATTLESHIP POTEMKIN, 1925[11]
2. EISENSTEIN, BATTLESHIP POTEMKIN, 1925[12]
3. J-L GODARD, BREATHLESS, 1960[13]
4. A. TARKOVSKY, THE MIRROR, 1954[14]
5. D. VERTOV, KINO PRADA, 1925[15]
6. A. HITCHCOCK, REAR WINDOW, 1954[16]
7. L. KURUSAWA, SEVEN SAMURAI, 1954[17]
8. L. KURUSAWA, SEVEN SAMURAI, 1954[18]
9. M. SCORSESE, WHO'S THAT KNOCKING AT MY DOOR, 1967[19]

FIG. 1. PIONEERING MONTAGE WORKS FROM THE CINEMA.

[11] Visited in: 31 March 2012, web site: http://www.suite101.comview_image.cfm816124; potemkin.
[12] Visited in: 31 March 2012, web site: http://northcountysinglesclub.org/coax-potemkin-stair/.
[13] Photograph: Ronald Grant Archive: Visited in: 31 March 2012, web site: http://www.guardian.co.uk/film/filmblog/2007/nov/30/catchofthedaygodardadmits.
[14] Visited in: 31 March 2012, web site: http://blogs.columbiaspectator.com/spectacle/2009/07/10/tarkovsky-fest-day-3%E2%80%94-piecing-the-shatters-of-life-the-mirror/.
[15] Visited in: 31 March 2012, web site: http://www.circassiancenter.com/cc-turkiye/sanat/genel/12-dziga.htm.
[16] Visited in: 31 March 2012, web site: http://corndogchats.blogspot.com/2011/10/rear-window-1954.html.
[17] Visited in: 31 March 2012, web site: http://susan-fama.blogspot.com/2012/01/seven-samurai.html.
[18] ibid. http://susan-fama.blogspot.com/2012/01/seven-samurai.html.
[19] Visited in: 31 March 2012, web site: http://oldfilmsflicker.tumblr.com.

Apart from cinema and philosophy, we came across with the ideas or techniques on montage, even before the pioneering works of cinema or Eisenstein, in the world of art, especially in the visual and applied arts such as painting and photography. The following people, groups and their works are some of them, which are also called as pioneers in terms of both their specific art works, and in terms of their montage techniques. That is: Dadaists, their discourse and productions, e.g. M. Duchamp, Nude Descending A Staircase (1912); El Lissitzky, and his photographic images, e.g. Photomontage of the Wolkenbuge (1925); L. Moholy-Nagy, his photography and his book Vision in Motion (1947), e.g. Untitled Multiple Portrait (1927); Surrealists, their paintings, their fascinating way of using time-images as we saw in the M. Ernst's and S. Dali's paintings; Futurists and Supremacists, their approaches to montage or collage; P. Picasso and G. Braque, and their cubist paintings, which are concentrated mostly abstracted movement and time images attempting to multiple and synthesize the different modes, e.g. Picasso's Still Life with Bow Land Fruit (1912), Braque's Fishing Boats (1909); R. Delaunay and his paintings bringing different images and scales together e.g. Graphic Champs de Mars: La Tour Rouge (1911-1923); M. Duchamp and A. Rodchenko, their moving sculptures e.g. Rodchenko's Spatial Construction no. 12 (1920). As it was mentioned, these works are the pioneering examples in the montage works as far as being pioneering works in their own field! (see Fig. 2 for some examples)

PICTURES FROM LEFT TO RIGHT:
1. M. DUCHAMP, NUDE DESCENDING A STAIRCASE, 1912[20]
2. EL LISSITZKY, PHOTOMONTAGE OF THE WOLKENBUGE, 1925[21]
3. L. MOHOLY-NAGY, UNTITLED MULTIPLE PORTRAIT, 1927[22]
4. A. RODCHENKO, SPATIAL CONSTRUCTION NO. 12, 1920[23]
5. M. DUCHAMP, NETWORK OF STOPPAGES, 1914[24]
6. G. BRAQUE, FISHING BOATS, 1909
7. P.PICASSO, STILL LIFE WITH BOW LAND FRUIT, 1912[25]
8. R. DELAUNAY, GRAPHIC CHAMPS DE MARS: LA TOUR ROUGE, 1911-1923[26]

FIG. 2. SOME PIONEERING MONTAGE WORKS FROM THE WORLD OF VISUAL ARTS.

[20] Visited in: 24 Dec 2011, web site: http://blanchardmodernart.blogspot.com/2010/10/marcel-duchamp-and-surrealism.html.
[21] Visited in: 24 Dec 2011, web site: http://rosswolfe.wordpress.com/2010/10/02/el-lissitzky%E2%80%99s-%E2%80%9Carchitecture-in-the-ussr%E2%80%9D/.
[22] Visited in: 24 Dec 2011, web site: http://museumpublicity.com/2011/01/30/gemeentemuseum-den-haag-opens-laszlo-moholy-nagy-the-art-of-light/.
[23] Visited in: 30 March 2012, web site: http://www.moma.org/collection/browse_results.php?object_id=81043.
[24] Visited in: 30 March 2012, web site: http://www.moma.org/ collection/browse_results.php?criteria=O%3AAD%3AE%3A1634&page_number=13&template_id=1&sort_order=1.
[25] Visited in: 20 March 2012, web site: http://faculty.etsu.edu/koterbay/20thtest2.html.
[26] Visited in: 24 Dec 2011, web site: http://faculty.etsu.edu/koterbay/20thtest2.html.
[27] Visited in: 31 March 2012, web site: 310312, http://en.wikipedia.org/wiki/File:Delaunay_ChampDeMars.jpg.

In addition to these art works, there are some architectural works, even though most of them having done after 60's, 70's, even 90's, and in 2000's[28]. They could be called as pioneering montage works in terms of their place in architectural design and representation, and also spatial discoveries that they brought up. Common thing among their designers/ architects is that they apply montage as a technique or theory as a being part of their overall design approach just in the pioneering art works. The following architects and the
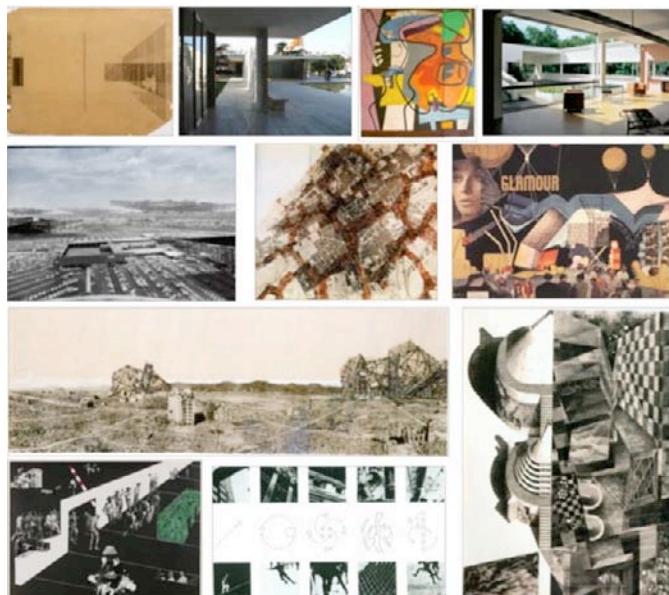
PICTURES FROM LEFT TO RIGHT:
1. M. VAN DER ROHE, BARCELONA PAVILION INTERIOR PERSPECTIVE, 1928[30]
2. M. VAN DER ROHE, BARCELONA PAVILION,1929-31[31]
3. LE CORBUSIER, FEMME ET COQUILLAGE, 1948[32]
4. LE CORBUSIER, VILLA SAVOYE, 1929-31[33]
5. WAI, NEW BABYLON AS THE SOUTHDALE CENTER, 2011[34]
6. CONSTANT, FROM NEW BABYLON, 1957[35]
7. ARCHIGRAM, INSTANT CITY[36]
8. A. ISOZAKI, RE-RUINED HIROSHIMA, 1968 [37]
9. R. KOOLHAAS (ET.AL.), EXODUS-THE RECEPTION AREA, 1978[38]
10. B. TSCHUMI, THE MANHATTAN TRANSCRIPTS PART:4, THE BLOCK, 1979-80[39]
11. E. O. MOSS, FUN HOUSE, 1980[40]

FIG. 3. PIONEERING MONTAGE WORKS FROM THE WORLD OF ARCHITECTURE.

[28] Our Studio works could be counted among these experimentations. (See the projects, Tables 4-7).
[29] J-L Cohen is also calls Mies van der Rohe as "pioneering the architectural use of montage." Cohen, J-L. 1996. Mies van der Rohe. London: Taylor & Francis, p.16.
[30] Visited in: 24 Dec 2011, web site: http://77www.moma.org/collection/object.php?object_id=87528 .
[31] Visited in: 24 Dec 2011, web site: ccainteriordesignfall2010annamaciel.wordpress.
[32] Visited in: 24 Dec 2011, web site: http:// hipwalk.blogspot.com/2009_02_01_archive.html.
[33] Visited in: 24 Dec 2011, web site: http://www.architectural-review.com/the-big-rethink/the-big-rethink-farewell-to-modernism-and-modernity-too/8625733.article.
[34] Visited in: 24 Dec 2011, web site: http://waiarchitecture.blogspot.com/2011/04/what-about-avant-garde-megastructures.html.
[35] Visited in: 24 Dec 2011, web site: http://nervousgnosis.tumblr.com/post/19577656390/den-haag-from-new-babylon-constant-nieuwenhuys.
[36] Jeoung, K. 2005. Dancing with Archigram. Seoul: Space, p.50.
[37] Cook. P. 2008. Drawing: The Motive force of architecture. Chichester: Willey, p.22.
[38] Visited in: 24 Dec 2011, web site: http://www.moma.org/collection/browse_results.php?criteria=O...
[39] Cook, P. ibid, p.32.
[40] Cook, P. ibid, p.34.

works are some of them: e.g. Mies Van Der Rohe[29] and his Barcelona Pavilion (1928); Le Corbusier and his Villa Savoye (1929-31); Constant Nieuwenhuys and his New Babylon (1956); Archigram and their anime drawings, e.g. Instants City (1968) and later P. Cook and collaborative drawings, e.g. Sponge City (with C. Hawley and G Whale, 1975); A. Isozaki, Re-Ruined Hiroshima (1968); R. Koolhaas, who studied cinema before architecture, and his early drawings as his diploma project in the AA, Exodus (with E. Zenghelis, M. Vriesendorp, Z. Zenghelis, 1978) and some OMA's publications such as Content (2004); especially B. Tschumi and his Manhattan Transcripts (1979-80) and then his Parc de la Villete project (1982); E. O. Moss and his Fun House (1980). They are basically some innovative works dealing with or applying potentials of (jumping, moving or superposing) montage, in other words, potentials of movement-images and time-images together with the potentials of architectural or other design conventions.

MONTAGE IN ARCHITECTURAL DESIGN - IN THE CASE OF 'ARCHI-CINE SECTIONS'
OR 'SECTIONAL-MONTAGES'

The connection with the idea and techniques of cinematographic montage, in this case-here, has started while working on the hybrid, in-visible, complex structures of cities, and especially while asking a question on: how we can read, disclose and re-present these complicated, relational webs of cities; e.g. spatial, temporal, life organizations of Istanbul. In fact, this effort is not only for documentation but especially for the de-construction and re-construction of existing city structures. It is, basically, about designing, in which already an approach has been figured out and titled as 'critical-cultural and cinematographic city conceptions' (Senturer, 2006). This approach involves into the critical-cultural attitude (questioning, dialogue, situation, duration, empathy, and contextual positioning) and cinematography (temporality, spatiality, movement, space-time interactions, and duration again) in addition to the conceptualization and imagination. After that, the concept of (photographic and) cinematographic montage has taken a stronger position within this main stream design approach because of afore-mentioned potentials of montage, and then further researches and experimentations have done.

Besides, during this research and experimentation process-involvement in cinematography, philosophy, urban architecture and architectural design/representation together; it was seen that the key targets and concepts behind the theory and techniques of montage (developed by Eisenstein, Deleuzé and others) is quite similar to the intentions and concepts of the architectural design approach here (designing through the critical-cultural and cinematographic city conceptions; archi-cine sections) as follows, at the Fig. 4:

Key-concepts behind the approach here	Key- concepts behind the notion of montage
critical inquiry; questioning, dialogue	dialogue
duration, temporality	duration, movement, temporality
contextual, situational attitude	contextual attitude
section, code	cut , image
longitudinal section	moving images
border-lines	(movement image), time-image
archi-cine section	montage, intellectual montage
unexpected connections	intellectual montage, third meaning
space-time	time-space
hybrid, new, open-ended	third thing, open-whole
design studio, cinematography, third space	film studio, cinematography, third space

FIG. 4. COMMON OR SIMILAR CONCEPTS IN BETWEEN THE APPROACH HERE AND THE NOTION OF MONTAGE…

Even it was noticed that some key concepts coming from architectural design/representation field or technique such as 'architectural section' has been indicating further inventive positions, when they meet with the notion of montage! For example: 'critical section' where genetic and generative codes of the life and space appears, which refers to cut and montage in cinematography. For example: border-lines, as ready-made critical time-images or time-sections or time-lines of life and space, which refers to cut and montage again. For example: architectural design studio that is ready for questioning, for making projections and proposals for the life and space, which exactly refers to cinema or visa verse. Therefore, the idea and technique of architectural-cinematographic section, briefly, 'archi-cine section' has been developed; and one step further, it was called as "designing through layered 'archi-cine section' or 'sectional-montages' as in this article.

Archi-cine section, basically, brings the potentials of architectural section with the potentials of (photographic and) cinematographic montage together: The one, architectural section, involves in, reveals, and proposes in-visible, hidden sides, codes, contends of life and space architecturally-mental (virtual) and material (emotional and physical) discovery and set of space and time, life. The other one, cinematographic montage, moves on, cuts, brings different images, entities of life and space, thus involves in the in-visible cinematographically-real and imaginative (virtual) discovery and set of time and space, life. Archi-cine section, therefore, uses cuts, overlaps, super-positions, juxtapositions and shifts by bringing these techniques and ways of thinking together. And it does do not only in the form of moving images, film but also in the form of 2d illustrations! This approach

and its technique are also open to tabling[41] and diagrammatical thinking. That is, in fact, the relational and free thinking. This is the thing that we have been looking for reading, understanding and designing the metropolis. The thing that is ready to call new intervals, connections and interaction for life, space and time. Furthermore this approach is also having the potentials and possibilities of a poetical and cinematographic architecture.

In fact, all the examples-involved in the potentials of montage-coming from the world of art, design and architectures have been referring to the representative, critical and creative capacities of this technique. (see Figs. 1-3).

THINGS TO BE DONE THROUGH MONTAGE - ARCHI-CINE SECTIONS

In this matter, things to be done by archi-cine sections (addition of montage into the architectural design process), could be summarized as follows. However, before that, a discussion will be carried on the concept of 'time-image' (developed by Deleuzé) to shed more light on the idea of archi-sine sections or sectional-montages.

The concept of time-image is taken as an inventive tool in the approach; in the layered, relational thinking and design. The time-image has a potential of bringing different life, spaces and times sections. It applies and uses the potentials of intellectual montage. It is open to associations and new connections. Therefore, it opens the unknown and the whole, and breaks the rules of linear thinking and designing. If the capacity of movement-image and time-image is compared: the whole generated by the consecutive movement-images (of life, space, and time) is not as open as the whole generated by the coincidental or accidental time-images. Since time-image as an individual or moving image is associational and open as it was said. They are open to any kind of montage and interpretation. They are pregnant to the third thing, third meaning and third space. They are free from linear, consecutive thinking and composition. Through the time-images and intellectual montage, it is possible to put different layers-connected or disconnected-together, and thus it is possible to think and design freely. That's why they are inventive tools of the approach and the archi-cine sections.

Within this contend, the things to be done though montage at the architectural design process could be summarized as follows:

• Creating movement-images, extracted from the site or associational, conveying existing visible situations and leaving some (temporal and spatial) intervals/spaces among them and involving in time - lining up consecutively;

• Creating time-images, extracted from the site or associational or standing-alone having potential for displaying in-visible, hidden or completely imaginational intervals - overlapping free from continuous movement, time and space, and lining up coincidentally.

[41] Turk, S. 2010. Tabling Ecologies and Furnishing Performance. in Design Ecologies, L.Tilder & B. Blostein, eds., NY: Princeton Architectural Press, pp.114-129.

Along with, through the time-images:
- Creating new border-lines bringing and holding different pictures/narrations, signs, sizes, scales, techniques etc. together, and explaining, expressing existing ones and/or developing, building new associations, relationships, and then new intervals…

Accordingly:
- Drawing archi-cine sections generated by movement-images and/or time images (by super-positions), which could be longitudinal-vertical and/or planimetric-horizontal. That is to place cinematographic images into architectural sections, vice versa. In other words, that is to have 'n' dimensional affect into two dimensional representation by sectional-montages, which is holding both the capacities of cinematographic montage and architectural section together!

In the end, we can talk about having layered archi-cine sections-architectural and cinematographic sectional representations-through the montages. This kind of representation and designing technique/approach empowers the designer in the direction of conceiving, representing and projecting complex urban structures. It launches non-linear ways of thinking and designing. It helps to fold time and space, to set unforeseen, unexpected, schizophrenic connections revealing the meaning. It enables the designer to make projections thrown into the future. Therefore it is possible to talk about relational and free thinking and designing, and to talk about the formation of the new sectional codes… (See the examples from the Studio, Figs. 5-8)

Apart from these, such an approach, working and designing with archi-cine sections provides:
- An 'archive' giving an opportunity of going forward and backward in it, which is ready to be opened up from its intervals, and accept new additions;
- A 'design space' that is durational, in time; a space having the condition of being 'time in time' in terms of architectural design product and process;
- A 'design process' enabling designer to think and design in a temporality, which 'design process' appears as a temporal and spatial entity;
- A 'design milieu' awakening memory and dreams, ready for imaginations and animations, open to associations and designing.

DESIGNING THROUGH LAYERED ARCHI-CINE SECTIONS
Architectural Design Studio

Consequently, following the questions about: how we could read, understand, represent and project today's urban structures, which was the core site of architectural design and production; and how we improve the creative and critical design abilities of architecture students and look for the same competency in the field of architecture; developed an approach and a technique called here as "designing through layered archi-cine sections / sectional montages." In fact, architectural design studio was the main provocateur and

discussion platform of these questions and the approach. This approach, basically, has been developed at the Studio as parallel to the related theoretical researches and debates done in the academia.

Emphasis of the studio supervision, in relation to the approach, could be summarized as follows:

• Non-hierarchical teaching-learning process (supervision) - open, inter-active, reflective, dialogical…;
• Discovery based research - critical-cultural attitude;
• Critical and creative thinking - designing on the border-lines of city;
• Special call to the dreams and imagination - next to the critical-cultural attitude;
• Conceptualization - through the images and essays;
• Concentrating on urban/public space, theorizing and designing it - as movements, flows, inter-sections, passages and stops;
• Critically decoding existing architectural structures/buildings and projects;
• Working (reading, thinking and designing) with the layered images - designing through archi-cine-sections, sectional-montages;
• Theorizing (disclosing) the design process and product - writing essays on the design process;
• Sharing of the ideas, skills, knowledge - dissemination of information, experiences, processes and products among the members of the studio;
• Cinematographic and poetical architecture - final target;
• Exhibition and publication.

Therefore, each student starts her/his research and design process to elevate her/his own 'layered' archi-cine sections, which could be in the film and real model formats but especially in the poster format. The basic reason to do this, as it was mentioned, is to understand the critical issues, hidden dimensions and potentials of the site and to comprehend the theme by holding all related aspects and scales together. Looking for space-time-life interactions (by means of the layered archi-cine sections) is another key situation here. Students spend most of their time in and around the site to be able to involve into those situations precisely and intensely. In fact, 'border-line' condition in the site is other critical key situation, where is almost always Istanbul-the metropolis; it encourages and forces students for staying at site and making deeper researches. After spending such a concentrated and productive time at site and at the extensions of site, they create their archi-sine sections. During this process, they make many video records, numerous movement and time images, architectural drawings, essays, etc., thus they have deeper conception and representation of the theme and place. This process and works help them to figure out the critical conditions to take care and to project them into architectural decision making process. In the mean time, step by step, they produce several longitudinal and planimetric layered archi-cine sections (sections and plans). These sectional-montages are also refers

to the stages of architectural design development as situational, imaginary and projective. Accordingly, it could be mentioned from two stages of design process: first stage is architectural design development; and second stage is architectural project development. However first stage appears in three phases continuously interacting with one another. That is to say:

• The arch-cine sections (longitudinal and planimetric) at the first phase of the first stage are called as 'situational-sections' [I.s-1]. They concentrate on the (visible and/or in-visible) existing situations, critical conditions and potentials of the place in order to disclose them. It is the contextual and conceptual involvement in site (and theme) to find out the critical sections.

• After having situational archi-cine sections revealing critical conditions of the site (in relation to theme), developing imaginations and dreams are loaded into these situational sections. This second kind of archi-cine sections are called as 'imaginary-sections' [I.s-2]. They are created at the continuation of the first phase. Imaginary-sections, basically, bring existing critical situations and dreamy creative imaginations together. Those imaginations could be raised from the critical conditions or specifications of the site or free from them, but anyhow, they would be naturally connected with the site and theme. Time-images are the key tools here by freeing designer about making connections and bringing together anything that designer wants. Situational sections also somehow include imaginations and time-images but they mostly deal with the existing conditions of site and then with the movement-images.

During architectural design process at the Studio, moreover, several presentations, seminars, and discussions/critiques, and juries (as parallel to the phases of archi-cine sections) are done. Essays and an article are written dawn on rising concepts and especially on 'public space' to figure out its position and possible expansions in relation to the site. Talking and working on the border-line issues is another motivation of the Studio and the design process, which helps to distinguish critical issues and the potentials especially in relation to the public space. Writing essays is a continuing work to support the decision making process along with the semester. Therefore; life scenarios, space and time fictions, building activities and programs are discussed, written dawn, drawn, pictured and filmed via situational and imaginary archi-cine sections (interacting with one another). All the discussions and works, in the end, are needed to be reflected on the archi-cine sections.

• Then, the third section (the third phase of architectural design development) is ready to have programs and codes of space-time-life interactions. It concentrates on the passages and stops appearing at the border-lines of the site as a part of public space discussions. Archi-cine sections in this phase are called as 'projective-sections' [I.s-3]. However, it is important not to run away from the main theme and the concept, which have been risen from the first and second phases of the design development. In fact, that was the expectation and promise of the approach, to keep all the process in a dialog, in an open-whole

going reward and forward!

As it was seen, layered archi-cine sections have a key position here. They act as conceptual and technical tool - as collecting, combining and representing tools of architectural design process. They are also seen as a way to reach a cinematographic and poetic architecture. That is an architectural space rising from the cuts and overlaps, intervals and super-positions, movement and time…

STUDIO WORKS

Within this approach, the main theme of the Studio at the 2010-11 Spring semester[42] at ITU (Istanbul Technical University) was announced as "A Cinematographic and Poetic Architecture at Istanbul's Shorelines - as Passages and Stops." The Bosporus shoreline of Istanbul was referring to one of the border-lines of the Metropolis. Therefore each student had made her/his own journey on the shoreline and decided in which part of it he/she was going to work on. Then they started working on their situational, imaginary and projective archi-cine sections for capturing their own discoveries, creating their own concepts and making their own design decisions for developing the projects.

Four projects have been chosen to represent the studio works here; and the explanations were taken from the essays written by the students. (see Figs. 5-8)

'Public Mat' by Cansu Tunali: *"Making readings upon the possible project areas considering the perception of border-lines in the meaning of geographic, social and cultural relations: that is the study lead to find out the zone 'Sarayburnu.' On the edge of historical peninsula, 40000 square meter project area touches slightly natural borders and artificial borders corresponding physical conclusions. Research process by filmmaking, sectional-montages, perspectives of dreams, both, help to find out new textures of the area and to improve the theme of starting. All these pre-studies carried the project a single powerful physical action: split. Study continued to understand and reveal the split condition throughout the cinematographic and poetic potential of the area. Then the area is considered as a 'Public Mat' which has no certainty with its ranges and potentials yet. On the 'Public Mat', traditional routines are transformed and modernized by the creation of new environment. A program developed with correlation between private and public. With all its excitement, ground is split from sea inwards peninsula. Private programs are installed in these splits as office company and semi-public units are located where splits touches the public mat, as cooking institute, art ateliers, diving club. While, integrity and transmittance are discussed on macro-scale, quality of space and cinematographic perception are seized on architectural illusions that uphold the integrity of space with micro-scale approach."*

[42] Aforementioned Studio is supervised nearly in this contend since 2004 at the Istanbul Technical University, Department of Architecture, at the 3rd and 4th years levels (6-7 in 8 semesters). It was assisted by TA Bihter Almac in 2010-2012 Spring semester.
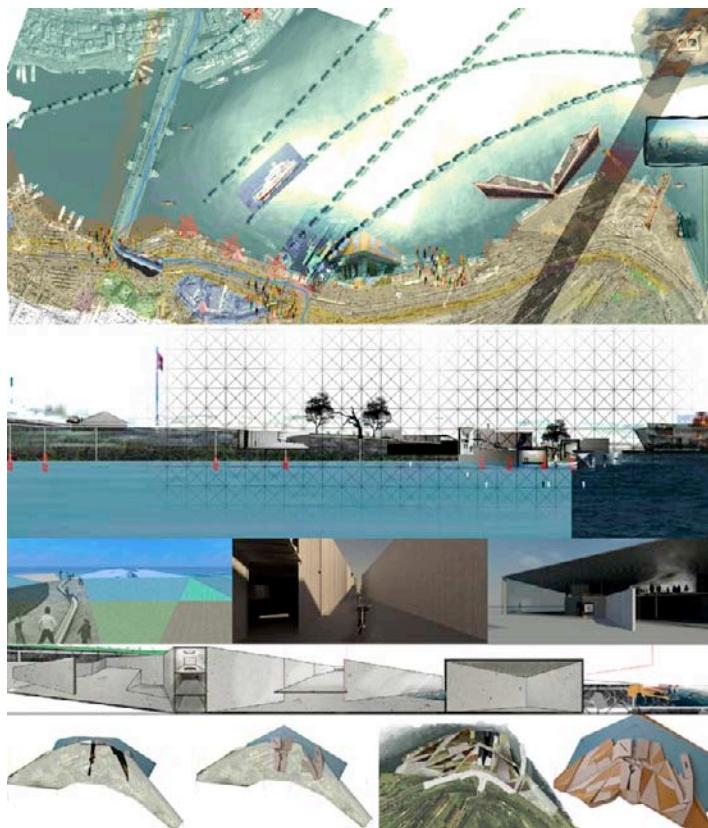
FIG. 5. 'PUBLIC MAT' (SITUATIONAL, IMAGINATIVE AND PROJECTIVE SECTIONS) BY C. TUNALI.

'Mixed Zone' by Cavidan Bayraktar: *"Project area was selected where there was a strong cut in between Kasımpasa, Sishane, and Halic Shipyard. At first, it was worked on the daily routine in the area; and movements, user profiles, usages, activities were searched. Then collected information, through the video records, pictures and drawings, were tabled for comparing and seeing the interruptions and possible connections (by means of archi-cine sections). During the field study, it was seen that these interrupted areas produce definite and indefinite movements depending on the programmatic distribution in the region (home and business). And there are always 'others' in these separated areas! Therefore, the area called as a buffer zone; a zone that is needed mixing the others. Then project was called as a 'Mixed Zone' that is bringing different acts, dimensions and densities together to produce a hybrid life and architecture. Utilizing the self-existing dynamics originated from the area, definite movements called as static ones, and indefinite movements as active ones. Static ones, in the scenario, are generated by the citizens living in the metropolitan area, and active ones are generated by the neighborhood users. To soften passage from static to active, the information of the static movements were directed*

and transferred to the active ones and vice versa. Therefore architectural program offered exhibition surfaces, installation boxes, shop units, workshop areas, a conference hall and a day care center as open, semi open and closed walk ways and activity spaces for differ-ent kinds of users and usages. Then borders, socially and spatially, become blurred…"
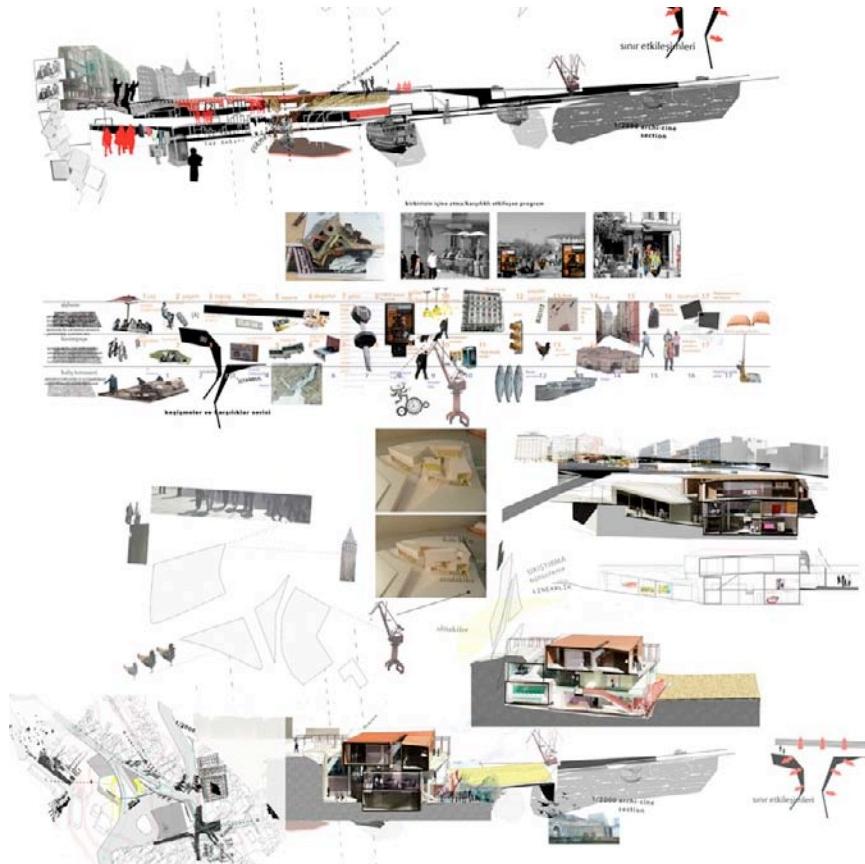

FIG. 6. 'MIXED ZONE' (SITUATIONAL, IMAGINATIVE AND PROJECTIVE SECTIONS) BY C. BAYRAKTAR.

'Pored Canal in between Edges' by Hazal Yücesoy: *"When thinking about border conception, the physical position of border and disjunction can be observed and analyzed all through in Halic. Halic is perceived by 3 main layers: Water, green band, which takes the place of the industrial life and is detached by the fabric, and the fabric in the slopped area. The disjunction in all through Halic becomes critical in Balat, having economic, socio-cultural, physical problems and a reserved life in the metropolis. On the contrary of being solid, the band is poured in order to transfer the potential of fabric layer to the green band and water, blending the layers, clearing the sharp lines of the banding*

position. Thus it can set ground for transition, passing and encountering. The shopping district and the people effuse from the boundary and opens to Halic, to the city. It transforms the spaces which are just used for passing to a station. A pored canal which extends the street opening from the boundary to the water is designed. And it springs to life a recycling economic model and planned as a system experiment. The production and circulation relationship is organized between local and urban scale. In this specific canal includes manufacturing shops, restaurants, cafes, hostel, commercial places, and water sport centre as a stop in the edge between the water and land. The spaces become integrated and let crossing usage and accesses. For this area just a canal is designed, but in Halic scale, new canals, which draw their strength from the district, should be designed."
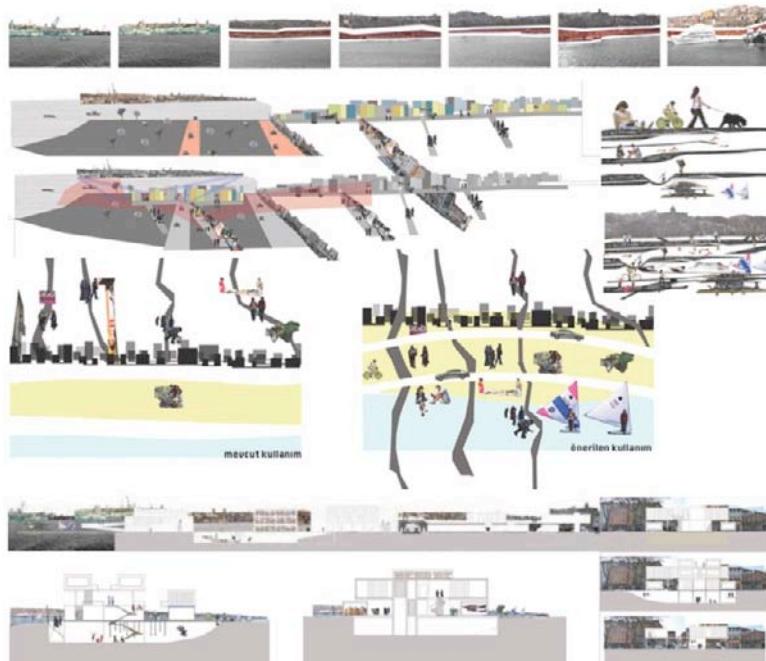
FIG. 7. 'PORED CANAL IN BETWEEN EDGES' (SITUATIONAL, IMAGINATIVE AND PROJECTIVE SECTIONS) BY H.YÜCESOY.

'Jointed-Legs' by Ece Ustun: *"Halic shipyard on Istanbul's shoreline was chosen as a perceived visually but inaccessible area. Drawing a situational archi-section passing from Kasımpasa towards shipyard and reaching to the Golden Horn revealed this critical condition of the site, which was composed of different kinds of both visible and invisible borders containing potential to dissolve vaguely. By identifying the contrary situations in the gaps between the borders, detailed analysis was done through the situational section*

and then an imaginative section was developed. Space codes were created considering different motion situations to user, space, time and perception. These space codes of actions produced architectonic section fragments and induced to the holistic imaginative section. By superposing the imaginative section with the situational section, the architectural section would be permeable to public and it would provide a cinematographic perceptional diversity by moving across this long circulation surface and pausing at specific points. Three layers of passages with different permeability are designed. Overlapping and expanding of passages on three different levels formed the enclosed areas of experiencing and encountering: watching tube, bridge and tunnel, library-archive, studios of performance (visual, dance and music) production and platforms of performance presentation."
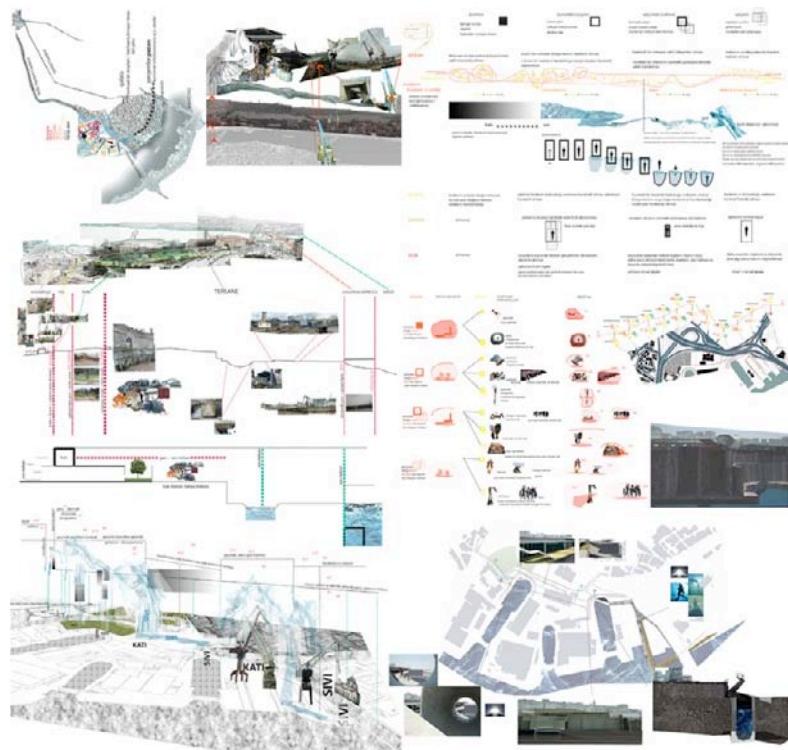
FIG. 8. 'JOINTED-LEGS' (SITUATIONAL, IMAGINATIVE AND PROJECTIVE SECTIONS) BY E. USTUN, 2010.

Achievement of the Approach and the Studio could be followed by the projects[43], which deliver the design process and the products next to the achievements of the students. Nonetheless, examination could be done in terms of: I) Thematic and conceptual design

[43] Project details and the other projects could be followed form the web page: www.archi.cine.itu.edu.tr.

development-rising concepts; II) Re-presentational development-expression of the ideas, formation of a new representational language; III) Design development-developed critical and creative positions, programs and spatial organizations; IV) Cinematographic and poetic architecture-architectural space quality, developing sense of space.

When the projects are examined from those points of views (considering all process and products such as short-films, sections, essays, modals, etc.), it is possible to mention from some certain conceptual, representational and spatial/architectural design qualities indicating both studio's and students' success. Followings are some indicators about those good qualities:

- different site choice… made by each student - a supervision supporting different decisions;
- differing (new creative) representations - a studio atmosphere supporting different backgrounds;
- differing design attitudes and decisions - a studio supporting different visions;
- creative conceptual design decisions (see C. Tunali's Project, Fig. 5);
- critical conceptual analysis and decisions (see E.Ustun's Project, Fig. 8);
- carefully done contextual analysis, de-coding processes, de-structuring and re-structuring processes (see C. Bayraktar's Project, Fig. 6);
- strong critical attitudes and proposals (see H. Yucesoy's Project, Fig. 7);
- different architectural projects, spatial organizations - a supervision providing a studio environment open to individual and group works being inter-active, reflective, dialogical.

These are some of the evidence of an open studio… open to different attitudes, choices, ideas, dreams… open to re-search, discovery, and creativity. These are the clues of the person-specific and site-specific design approach. These are, in fact, the conclusions of a studio based on 'critical-cultural attitude' and layered 'archi-sine sections' or 'sectional-montages' working on the 'border-lines' of a metropolis/city.

CONCLUSION

These experimental works of studio have shown and supported theoretical and technical insight of the approach: 'Designing through Layered Archi-Cine Sections or Sectional-Montages' supplies a creative and critically strong urban (reading) and architectural design approach - theory and technique. When the potentials of cinematographic montage and architectural section (vertical and/or horizontal) come together with the certain qualities of critical-cultural attitude, it creates an open-ended creative design approach that is open to critical and poetic architecture… In this condition, even, it is possible to say that-especially all these qualities meet with the border-line situations in city-a new montage, in other words, a third space theory appears.

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THE ROLE OF DIGITAL TECHNOLOGIES FOR THE INNOVATION OF THE LEARNING EXPERIENCE IN THE UNIVERSITY CLASSROOM: A CASE STUDY

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The constant transformations observed in society and in contemporaneous culture do not leave doubts that the educational sector will have to change radically in the coming years. In this sense, digital technologies configure an important ally for the innovation of the educational space since they provide the development of new learning experiences and widen the possibilities for change. Considering this context, the current article analyses and synthesizes the role of digital technologies in the learning experience shared by students and teachers in the classroom. So, a qualitative and empirical investigation of the case study type was carried out with the objective of developing a diagnosis about the context of a specific environment of the classroom as well as about the use of technological resources in this space. As a result, it is possible to point out the need for developing new learning experiences shared by students and teachers in the classroom because the current methods establish a conflict between the way in which different generations think, perform and search for knowledge.

••• Classroom of design, digital technologies,
innovation, learning experience •••

1. INTRODUCTION

In the last decades of the 20th century, a series of technological and scientific innovations evidenced that a moment of instability was emerging. In consequence, "a technological revolution concentrated in information technologies started remodelling the material basis of society at an accelerated rhythm", by inaugurating new perceptions regarding the relation between time and space (CASTELLS, 1999, 39). In Castells´ conception (1999), the new system of communication generates a flow space that substitutes the space of places, in the same way as time becomes in-timely.

Bauman (2001) utilizes the term fluid as a metaphor for this new context by observing

that, unlikely the solids, fluids do not keep their shape easily neither attach themselves to space and time. In the author´s point of view, fluid translates the acceleration of the changes that characterize the present time while solid symbolizes the rigidity and the inertia that characterizes the industrial age.

Towards this thought, Capra (2006) finds out that contemporaneousness points out a new vision of the world, in opposition to an old paradigm that reflects the conditions of an industrial society. Thus, by analyzing the contributions of the works of Bauman (2001) and Capra (2006), it is possible to state that society experiences a unique and important moment that requires news glances at ancient problems and a new glance at the way how the future of society is being guided.

Concomitantly, it is opportune to point out that, with the new technologies and the scientific development, society and culture have changed significantly. In justification thereof, Lévy (1999) finds out that culture, society and technique are independent entities, i.e., technology is, at the same time, product and producer of society and culture. Therefore, it becomes evident why several sectors of life have been undergoing a transformation from this revolution on, thereby giving reasons to the need of parallel innovations with the aim of responding to the new emerging demands. According to this logic, the educational sector exemplifies this situation well, since the technological revolution has modified the way people live, face the world and learn (AMAR, 2008).

However, the educational sector did not follow the technological development and, for this reason, it requires a larger contextualization in order to respond to the expectancies of the students and of society itself (NETTO, 2005; TAPSCOTT, 2010). According to Netto (2005), one cannot ignore the fact that contemporaneous youngsters know computer, internet and mobile phone since the day they are born and so they develop expectancies regarding the learning process that include the new digital technologies. Tapscott (2010) attributes to these youngsters the denomination Internet Generation[1] by pointing out that, different from the previous generations, this generation does not intend to be a spectator but, instead, an agent of experiences that are more and more interactive in an environment that is permanently connected. So, the author sees in the technological evolution a great promise for the transformation of the traditional learning model because if, on one side, this evolution modified society, on the other, it can provide a review of the current teaching models.

Considering this context and the fact that, in order to guide the innovation of the classroom from digital technologies, one must, at first, identify the teaching practices that already employ these tools (CUDD et al, 2003), the current article has the objective of analyzing and synthetizing the role of the technologies in the learning experience shared by students and teachers in the classroom. Therefore, it is about the preliminary results of the Master Degree

[43] The term Internet Generation refers to the generation that nowadays are 14 to 34 years old.

Paper in Strategic Design that has the objective of knowing the experiences and perceptions of teachers and students of university level regarding the daily learning experience in the classroom as well as about the role of digital technologies within this context.

2. THEORETICAL FOUNDATION

2.1. Learning in the Classroom

Historically, education is guided according to a unique learning model focused on instruction, which can be named unidirectional learning. In this model, the teacher behaves as a specialist, holder and conveyor of informations while the student performs as a passive receiver whose main obligation is assimilating the conveyed information. Thus, it has been agreed that it is through repetition, experience and practice that information can be memorized and, further on, transformed into knowledge (TAPSCOTT, 1999). Consequently, activities performed in classrooms trend to reinforce this model from practices that induce the student to memorize pattern and pre-established contents.

For Tapscott (2010), this teaching model has in its essence the same principles of mass production that characterized the industrial age. Thus, the same thing is taught to all of the students the same way. However, this rigid teaching model has shown to be inefficient while the new generations are growing in an interactive digital environment totally different from the environment of the industrial age.

Within this globalized cultural context and of quick access to all types of information, it is practically impossible to centralize knowledge in education institutions or in the figure of the teacher because the quantity and diversity of knowledge topics are practically infinite and are in constant multiplication. For Netto (2005, 79), education "is in front of new challenges since it is not considered anymore, as it was thirty years ago, the genuine source of information of the students". As a consequence, the students and the teachers of the 21st century are not before stable knowledge anymore but, instead, they are confronted with a "chaotic flowing-knowledge", whose direction is unpredictable and uncontrollable (LÉVY, 1999, 135).

Besides, Lévy (1999) finds out that knowledge itself has acquired a validity date which has become more and more limited. In the perspective of the author, a reality that has the trend of being intensified is that the knowledge acquired by a person becomes obsolete even before the end of his professional career. Thus, quite different from the industrial conception of labor, in the information age, its concept becomes synonym of learning, conveying knowledge and producing new knowledge. The pattern knowledge and the technique offered by the university education are not enough anymore; the new professional must be prepared to construct his own knowledge.

Within this context, the need of a new approach arises for the teaching process, taking into consideration the new needs and possibilities inaugurated by the breakthroughs of the digital technology. So, it is the task of the educational sector exploiting the new technological

tools in a positive way according to a perspective that aims at learning while "a technique is neither good nor bad (it depends on the contexts, uses and points of view), nor neutral (since it is either conditioning or restrictive)" (LÉVY, 1999, 26).

Christensen (2009, 18) considers that learning based on computers allows attenuating one of the main deficiencies of the current teaching model, that is, the standardization of the learning process. According to the author, "learning centered on the student is the escape from time, side, physical and hierarchic cells of standardization" that allows that each student learns according to the mode that better suits his style. Within this model, the teacher´s role is also transformed because he no longer is an information transmitter and becomes a guider of the process and an architect of contents. However, considering that computers are already present in a large number in the classrooms, why, till now, their presence has not made possible the transformation of the traditional teaching model?

Such situation is the reflex from the insertion of the new technologies in a context that does not offer the opening for innovation. In the perspective of Tapscott (1999), the current scenery of classrooms is the result of an adaptation process of the technology to the conventional teaching context. Thus, computers have been utilized only to replace old tools, by evidencing the rigid nature of the educational sector where old paradigms demonstrate resistance to the change.

2.2. New technological possibilities in education.

By observing the transformations nowadays and the new facilities inaugurated by the digital technologies, there is no doubt that the educational sector will have to change radically in the coming years. Nevertheless, in spite of the new possibilities of distance education, the alternative learning approaches will hardly replace the advantages of education based on experiences in the classroom (HAVHOLM & STEWART, 2001). In view of this, it is opportune re-thinking the learning model in this space considering the advantages brought by the breakthroughs of the digital technologies (NETTO, 2005).

As per Balotsky and Christensen (2004), education in universities must develop a hybrid strategy for the change by combining the advantages of the experience in the traditional classroom with the new possibilities inaugurated by the digital technologies. In this sense, many studies introduce contributions able to stimulate and guide a reflection about the different application possibilities of the technological tools in the context of the classroom. For Cudd, Lipscomb and Tanner (2003), the analysis of the current uses of this equipment for education is fundamental for any project that searches for the change of the educational sector practices.

In view of the above, the below table shows some literature that approaches the use of technological tools in the teaching-learning process and evidences the advantages of using them in the classroom.

Technological tools/Author	*Advantages of using them in the classroom*
Videoconference/Amar (2008)	• Virtual communication in real time by means of sounds and images; • Exchange of information and knowledge in an interactive way by people that are geographically distant from each other; • Simultaneous participation of groups.
Weblog/Amar (2008)	• Publication of contents in texts, videos and photos; • Open participation; • Possibility of sharing information like, for example, doubts, personal comments, solution of problems, etc.; • Creation of communities of students and teachers interested in the same subject; • Collaborative work.
Virtual simulation/Lévy (1999)	• Broadening of individual imagination; • Formulation and quick exploitation of great quantity of hypothesis.
Platform for evaluation/Pellegrino and Quellmalz (2010)	• Immediate feedback; • Integration of knowledge; • Generation of diagnosis.
Educative videos/Thompson (2011)	• Visualizing the content of the video at any time and as often as needed; • It makes possible utilizing the time in the classroom for the development of practical activities and exercises that need the teacher´s follow-up.

TABLE 1. EXAMPLE OF DIGITAL TOOLS UTILIZED FOR THE LEARNING PROCESS.

However, in spite of the great potential of tecnology, Amar (2008) points out that the use of digital tools in the classroom requires the permanent analysis of their value for the learning process. These tools must not replace the practical activities or the role performed by the teacher (AMAR, 2008; HAVHOLM & LARRY, 2001), quite on the contrary, they must provide new experiences that contemplate different learning styles and make it possible the joint construction of knowledge.

3. METHODOLOGY

In order to reach the objectives described previously, the current article has been developed by means of a qualitative empiric investigation of the Case Study type. According to Yin (2001), this is a methodological strategy that does not require the manipulation of relevant behaviors related to the their object of study and for this reason it allows understanding complex social phenomena making possible an investigation capable of preserving the holistic and significant features of the analyzed events. In general, one believes that the selection of this method allowed gathering a series of context information that is relevant for the comprehension of the experience lived by teachers and students in the classroom.

The research was developed in the Design Course – Graduation: Design of *Universidade do Vale do Rio dos Sinos* - Unisinos[2]. The choice of this institution and, more specifically, of one class of students and teachers of the 4th semester of the Design course as a unit of study (Learning Program 4 - LP4) took place by taking into consideration the innovation level provided by the guidelines of the Pedagogical and Political Project of the course which projected its education activities by means of a model that questions the discipline paradigm by evidencing that its institutional environment offers the opening for initiatives that search for changes. Besides, the choice of the referred class is justified by the fact that it is in a stage of formation what allowed it to experience in the classroom different practices and learning approaches as well as observing the uses assigned to technologies in this space.

The development of the Case Study started from the contact with the institution and the described graduation course. Thus, after authorization for the development of the investigation activities in site, the phase of approaching and working on the sensitiveness of the students and teachers of LP4 in order to incentivate their participation over the three procedures of the data collection (Figure 1). The first of them, the documental research, had the objective of presenting a brief description of Unisinos and the Design course. For such purpose, a survey gathered the main institutional documents like the Pedagogical and Political Project – Design Graduation Course and the Plan of Institutional Development.

As to the second procedure, the observation of teachers and students occurred in classrooms of the Design course during 18 periods of curriculum activities that took place from August 1st to September 2nd, 2011. In such places, besides the interaction between students and teachers, one tried to observe the motivations for using the digital technologies as well as the contributions and restrictions of these tools during the development of the activities proposed in the classroom. Thus, in order to guarantee the record of all of the observed details, notes and photos were taken. Table 2 presents some important information about the observed periods.

[2] Unisinos is among the largest private universities of Brazil with round 27 thousand students. According to data of the General Index of Courses published by the Federal Official Journal of November 2011, the University reached degree 4 in its 2010 evaluation, thus evidencing a satisfactory result that distinguishes it from most of the Brazilian institutions.
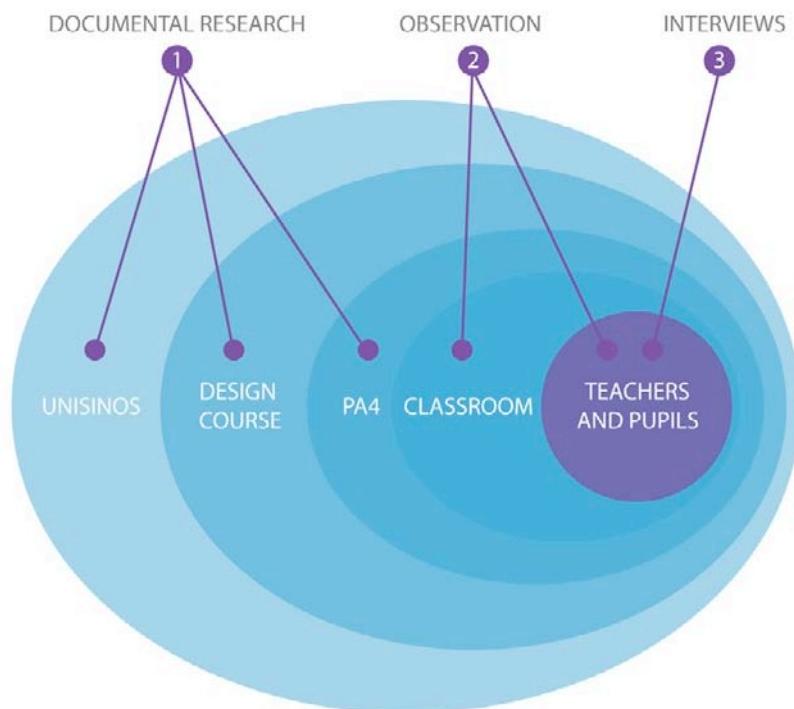
FIG. 1. ACADEMIC ACTIVITIES OF THE LEARNING PROGRAM 4: PROJECT OF THE SYSTEM-PRODUCT

Observation (O)	Date	Place	No. of students	No. of teachers
O∕1*	01.08.11	Porto Alegre	0	10
O∕2	15.08.11	Porto Alegre	12	2 e 1 apprentice
O∕3	15.08.11	Porto Alegre	14	1
O∕4	16.08.11	São Leopoldo	14	1
O∕5	17.08.11	São Leopoldo	10	1
O∕6	18.08.11	São Leopoldo	10	1
O∕7	18.08.11	São Leopoldo	10	1
O∕8	18.08.11	São Leopoldo	6	1
O∕9	19.08.11	Porto Alegre	12	1
O∕10	25.08.11	São Leopoldo	6	1
O∕11	29.08.11	São Leopoldo	13	1
O∕12	29.08.11	São Leopoldo	12	1 and 1 apprentice
O∕13	29.08.11	São Leopoldo	8	1
O∕14	30.08.11	São Leopoldo	8	1
O∕15	30.08.11	São Leopoldo	10	1
O∕16	01.09.11	São Leopoldo	10	1

| O-17 | 02.09.11 | Porto Alegre | 12 | 2 and 1 apprentice |
| O-18 | 02.09.11 | Porto Alegre | 13 | 1 |

* Meetings of teachers

TABLE 2. DETAILS OF THE PERIODS OF OBSERVATION OF THE CLASSROOM.

Finally, the interviews completed the process of data collection and were performed by the researcher with 4 students and 4 teachers of the LP4 aiming at learning their experiences and perceptions about the day-to-day learning activity in a classroom. It is worth pointing out that 2 of the interviewed teachers were also coordinators of the course.

In order to guarantee the maximum utilization of the collected information, all of the interviews were audio-recorded and transcribed. Tables 3 and 4 detail the period when the interviews took place as well as the pofile of each of the interwiewees.

Interview

Pupils (IP)	Date	Place	Sex	Age
IP-1	18.08.11	São Leopoldo	Feminine	21
IP-2	19.08.11	Porto Alegre	Masculine	18
IP-3	19.08.11	Porto Alegre	Masculine	22
IP-4	29.08.11	Porto Alegre	Feminine	18

TABLE 3. DETAILS OF THE INTERVIEWS CARRIED OUT WITH THE STUDENTS.

Interview Teacher

(IT)	Date	Place	Teaching Time	Sex	Age
IT-1	15.08.11	Porto Alegre	7 years	Feminine	32
IT-2	29.08.11	Porto Alegre	20 years	Masculine	52
IT-3	30.08.11	Porto Alegre*	10 years	Masculine	37
IT-4	31.08.11	Porto Alegre	4 years	Masculine	18

* Interview via Skype

TABLE 4. DETAILS OF THE INTERVIEWS CARRIED OUT WITH THE TEACHERS.

The analysis of the collected materials by the Case Study followed the model of Yin (2001) which presents the triangle concept that proposes connecting the collected information as show in Figure 2.
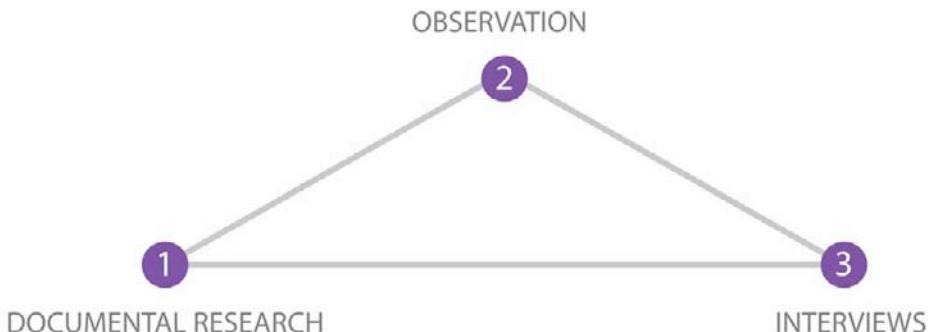
FIG. 2. MODEL OF ANALYSIS OF THE COLLECTED DATA.

In this sense, Martins (2008) finds out that the trustworthiness of the Case Study can be assured by crossing the sources of evidences and its contribution is even higher when the techniques of data collection are distinct as it occurs in the research in question. In the perspective of the author, the triangle process cooperates for the improvement and convincibility of the investigation discoveries, making it possible a corroborating style of research.

4. PRESENTATION AND DISCUSSION OF THE RESULTS

4.1. Context of the study

The class of students and the teachers of Design, the unit of study of this research, integrates the Graduation Course in Design of Unisinos which was developed in 2006 by means of a partnership with POLI.design, Consorzio del Politecnico di Milano (center of research and education in Design from Italy). According to its Pedagogical Political Project (UNISINOS, 2006b), the course offers to the regional community a new perspective about design, strongly supported in the concepts of strategic design and innovation.

Nowadays, the course is structured into 6 learning programs, each one with duration of a class semester. By means of these programs, one looks for establishing a curricular structure where different knowledge topics can be articulated through the development of projects that meet the demand of an actual client. For such, each LP is based on a Project Atelier, a central space that promotes the pertinent interdisciplinary work for the project activity. In this model, the knowledge topics are presented to the student by the academic activities, that is, activities of conceptual, practical or instrumental education with standard time schedule and which is obligatory to all of the students.

In the perspective of one of the interviewed teachers, this model challenges the logic of the

teacher as the sole holder of knowledge since it becomes necessary to plan the classes and contents aligned to the context of the project into development. Thus, it is probable that the teacher faces himself with the challenge of searching for new knowledge topics or approaches that have never been worked out before by discipline models in his field. In the opinion of the interviewee,

> *in this process, the students benefit from it very much, the teachers learn a lot because they have to build bridges with knowledge fields that are not theirs necessarily. He obliges himself also to research, to think, to articulate and to construct connections. Then, it moves the teacher from the comfort area. I think this is fantastic. (IT-3)*

Thus, based on the LP concept, the course aims at breaking the traditional linearity by means of a model that looks for promoting the constant articulation of theoretical and practical contents as well as among the knowledge fields involved in the professional education. Most of the teachers participating of this research believe in the benefits of the LP model although it has undergone modifications in its structure already foreseen in the Pedagogical Political Project (UNISINOS, 2006b) contributing therefore for the adequacy of the proposal to the practical reality of the course.

> *As I told you, neither is everything perfect nor is everything coming out perfect, but one corrects little things from one year to the other. (IT-4).*

In view of this, it is possible observing an institutional environment favorable to the change since one searches for breaking off with the university teaching model based on independent disciplines independent of the innovation level. As per Borjas (2006), the change in the educational sector will only take place if there is previously an open environment for innovation. For such purpose, the educational management plays a fundamental role in the measure that it makes possible the creation and internalization of innovating initiatives in the routine of the teaching institutions through a process that allows mistakes and successes as worded by the interviewed teacher. In this sense, one observes within the researched scenery that the institutional values reinforce the commitment with innovation the same way that the Institutional Development Plan (UNISINOS, 2006a) establishes proposals and initiatives that consider the need of adopting innovating practices to teach in the classroom as well as improvements and constant updating of technological infrastructure. The Learning Program 4 (LP4), the period when the current research was carried out, occurs in the 4th semester of the curricular activities of the course. In general, its objectives are: "understanding the elements that integrate the system-product as well as their relation with culture, the methods and the pertinent instruments for the development of strategic projects; building a strategy of sense for the existence of the product, by means of under-

standing the effective possibilities of the design processes applied to material and immaterial products" (UNISINOS, 2007).

For such purpose, the LP4 offers academic activities that aim at developing the needed competences so that the student reaches the objectives determined by the semester. Thus, besides the Project Atelier 4 that centralizes all of the knowledge, the student must attend all of the activities foreseen by the curricular plan as shown in the below figure.
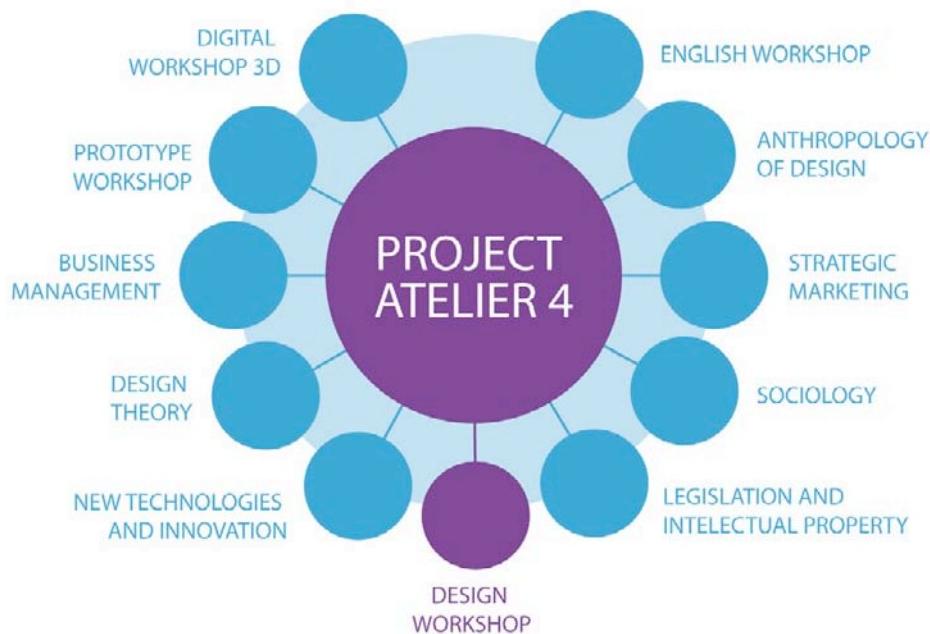

FIG. 3. ACADEMIC ACTIVITIES OF THE LEARNING PROGRAM 4: PROJECT OF THE SYSTEM-PRODUCT.

It is worth pointing out that, in the case of LP4 of the studied class of students and teachers, the client that motivated the project activities developed over the semester was the Bank of Food of Porto Alegre[3]. From thereon, each academic activity searched at relating its contents to the proposed theme, that is, food and childhood.

In the search for integrating the different knowledge topics, one has observed that, in some cases, the teachers have had difficulties to relate the activities proposed in the classroom to the project theme worked by the Project Atelier. This difficulty was even greater in the essentially instrumental activities that looked for working the technical ability of the

[3] The Bank of Food is formed by a group of companies and non-governmental institutions that manage the collection, reception and distribution of food donations for enrolled assisting entitities (BANCO DE ALIMENTOS, 2011).

student. So, the interviewed students were unanimous when they affirmed that previous experiences that were experimented in other learning programs (LP1, LP2 e LP3) did not guarantee the proposal of integrating different knowledge topics effectively. According to the words of the interviewed students,

> There was a semester, the LP2 I think, where we did not feel so much connection among the contents. I also think that it depends a lot on the focus of the client, isn't it, on the partnership that we have during the semester with the company. Not always one succeeds into getting a clear connection. (IP-1)

By means of the observations and of the interviews, it was possible identifying some factors that influence this perception of the student. Among them, it is possible mentioning: (a) the general characteristics of the client (sector, supply of information, availability to follow up the project); (b) the objectives of the project in question; (c) the effort and the constant communication among the teachers; (d) the coordination of the academic activities and of the project process developed during the Atelier; and (e) the participation and the effort of the student in the proposed activities.

Upon thinking on the relation among the social actors of the classroom context and the digital technologies, there are two points to be hightlighted. The first of them concerns the participation and the effort of the students in the proposed activities because one observed frequent delays in the arrival of the students as described below:

> The observed activities started with few students in the classroom so that the teacher expressed his concern about the absences. As the time goes by, the students arrive, some of them, more than 20 minutes late. At this point, the discussions had already started and one perceives that the teacher loses a considerable time upon retaking the content with the students that arrived after the beginning of the class. Even so, it is difficult for the student to follow up the discussions that were already going on. Thus, one observes that the delayed students open their computers and access blogs and social networks that are not apparently related to the theme under discussion in the classroom. (O-12)

Within this context, it was possible observing that the routine of students'delays made it difficult for the teacher to plan and develop a learning experience shared by the class because when they entered late in the discussion, the pupils lost the first stimuli of the class. So, the digital technology sometimes configured itself as an escape valve for the student and the access to social networks was observed with high frequency.

> The class started somehow confused although the teacher made much effort; it was difficult to catch the attention of the students who kept themselves entertained with their

*personal computers and showed themselves bored with the theme of the class. One per-
ceives that most of the students are connected to the facebook and that the access to this
social network is frequent during the class. (O-4)*

According to Tapscott (2010), such situation can be the reflex of the incompatibility
between the thinking modes of the Internet Generation and their teachers. The author
considers that the current teaching models, based on expository classes, are responsible for
the boredom observed in many students who are used to interact in the electronic means.
The interview below reveals that the teachers are aware of that, but they still have difficul-
ties to change this working model.

*(...) I was in a meeting on Saturday and the teachers brought examples and spoke about
power point saying that sometimes this tool is bore in a theoretical discipline. So, I am
thinking on changing this situation regarding the students. (IT-2)*

The second point implied in the relation among the social actors of the classroom context
and the digital technologies is regarding the communication among the teachers in the
measure that this is a fundamental factor for the effective integration of the different knowl-
edge topics. In this sense, one observed that in spite of the schedule of 3 presence meetings
among the teachers in average per semester, the communication provided by these meetings
seemed sometimes not enough in view of the objective proposed by the LP.
This finding results from the observation of the lack of frequent dialogue among the teach-
ers or other means that may render possible the comprehension of all of the activities that
have been developed by each academic activity individually, making it difficult the whole
follow-up of the learning process. Notwithstanding, when needed, the teachers made use
of the digital tools in order to share files and send e-mails by evidencing the technology
potential though little exploited for the indispensable communication among the teachers
before the curricular proposal.
Considering the above, it is possible to affirm that with the digital technology in the class-
room a new teaching-learning experience is introduced to the teacher and to the student.
Along with it, new challenges also arise since the use assigned to technology is what is
going to define its value for learning within this space.

4.2. Digital Technologies in the learning experience in the classroom
Digital technology makes part of the daily life in the contemporaneous society. It is present
in most of the houses, offices and classrooms around the world, by establishing new mod-
els of interactions and experiences, independent of space and time. The class of students
and teachers analyzed by this research is inserted in this context, a fact that allows watch-
ing it as a small sample of the current society.

However, as it occurs in society, within the classroom different generations get along and each one experiences the technological evolutions in a completely different way. In his work, Tapscott (2010) established frequent comparisons between what he calls Internet Generation and Baby Boomers Generation. According to the author, while the Baby Boomers underwent a process of adaptation to the digital environment, the Internet Generation was already born and raised plounged within this new context. Consequently, quite different from the previous generations, the youngsters of this generation have a natural affinity with the technology, by utilizing it in an intuitive way in order to communication, research and learn.

During the periods of observation of the curricular activities of the LP4, the great interest and attachment of the students to the digital technologies became evident; notwithstanding, the first action of most of the students when entering the classroom was taking the portable computer from the bag and turning it on.

> *Generally, I turn on my computer. The first thing that I do is taking the computer and turning it on, entering and staying on the internet until the teacher starts the class. (…) If the teacher is speaking about something that has a site, some reference, the first thing that I do is looking for this reference on the internet. If not, I keep watching novelties and download sites. I keep myself navigating on the internet. (IP-3)*

The Internet Generation students have natural affinity with the technology and feel at easy to perform different activities simultaneously (NETTO, 2005). For this reason, it was usual observing them accessing social networks and sites during the activities proposed by the teacher in the classroom. According to Tapscott (2010), the fact that these youngsters have been raised in a digital environment, full of stimuli and interactivity, has changed the way how the brain itself is scheduled. In the perspective of the author, this is a sign that this generation has developed new capabilities that are still strange to the former generations what can be perceived in the speech of the teachers like the following example:

> *There is a problem with the computers, isn´t it? Well, I love the computer, I am always in front of a computer, but the problem is that the student has much difficult to keep the focus in the discussion. Well, the computer is a fantastic thing which I adore and that could be great in the classroom… couldn´t it? If the student were there focused on it, searching information about what is under discussion, well, great, isn´t it? But this is not what happens most of the times. Most of the times, the student is wandering: msn, e-mail, and watching the tv programme…and things like this. (IT-2)*

In view of this situation, it is possible observing different attitudes before the digital technologies in the classroom: the student´s and the teacher´s. So, if on one hand the student

perceives the computer as a tool that is pertinent in the classroom, on the other hand, the teacher believes that the digital technology hinders the concentration of the student in this environment, moving his focus from the proposed activities. In this sense, it is possible to question the (in)correct use of these technological resources by the student. In the perspective of Netto (2005, 79), "it is at this point that education gains enormous importance as a process of "educating" the citizen before the new technologies", by guiding him onto a kind of use capable of potentializing his learning by means of access to knowledge topics that are relevant for his life and development. Thus, it is the teacher´s task to drill the positive use of the technological resources in the classroom once the student must leave from the university with inputs in order to understand the potentialities of the electronic instruments in the labor market.

> To me, the more technology the classroom has available, it increases its potential as a space of learning and construction of knowledge while it is also important that one observes that both students and teachers need knowing how to exploit this technology, isn´t it? (IT-3)

According to Netto (2005), it is important that the teachers feel themselves enthusiastic and challenged to exploit the potential of technology and internet in education since it provides them with opportunities to learn, together with the students, the best ways of utilizing the technological tools in the learning process in the classroom. Besides, Agbonlahor (2006) highlights that the teachers play a fundamental role in the process of implementing a successful change in the educational sector since the way how the teacher guides the activities in the classroom is what is going to define if the use of the tool makes possible the innovation to take place or if it will only replace the teaching resources usually utilized. Thus, it is important to point out that, independent of the individual use made by the student, the digital technology, in many cases, becomes an ally of the teacher because it was possible observing activities where its utilization favored the teaching-learning process making it more attractive for the student and more dynamic for the teacher.

> These monotonous things of following up texts, of reading, of talking about the texts are a little monotonous, I think, so that I cannot keep myself paying attention. Now, things are more dynamic like showing pictures, videos… then I have questions… then there is a reference on the internet… so it is not the teacher always keeping on talking and giving class like this. When there is participation of everybody, for me it is more interesting. (IP-3)

> (...) while the teacher kept on talking introducing the themes of the class, most part of the students class remained accessing social networks. However, in order to start the

discussion, the teacher shows a recent video from the You Tube. The students close their personal computers right away and, quite involved by the subject, they begin to participate of the class. (O-4)

This observation evidences the importance of an initial stimula that promotes the immersion of the student in the classroom. In this sense, as it occurs in the example of the video, the digital tools seem quite proper. At the same time, the interview demonstrates that the student tries to be an active agent of the learning process. In the perspective of Tapscott (2010), the students of the Internet Generation appreciate the interactivity and the dynamics of the activities in the classroom and this transformation of the student´s profile vis-à-vis the former generations is directly connected to the breakthroughs of the digital technologies and their great influence in the society and in the day-to-day life of the students.

Therefore, according to the same author, it is not surprising that teachers-commmunicators and TV channels are losing their audience because the youngsters do not feel attracted to this unidirectional model of communication anymore. Students that grew up surrounded by interactive digital stimuli do not want be taught. They want to learn and search for knowledge in a joint way.

Before this context, one observes that the presence of digital technology in the classroom and the different ways of thinking lead teachers and students to live distinct experiences in this space. So, while the teacher perceives the classroom as a delimited space where the interaction with the student is mediated by technological tools of unidirectional nature like the power point projection (Figure 4), the student experiences a completely distinct context where he at the same time attends or participates of the class and interacts with friends in social networks, becomes informed about the last novelties in blogs and makes quick researches in the internet. Thus, it is possible saying that, for the student, the notion of space and time of the classroom was transformed considering that the walls are not the actual limits and the teacher is not the sole source of knowledge. For the student, all of the information and knowledge are at a "click" of distance (Figure 5).
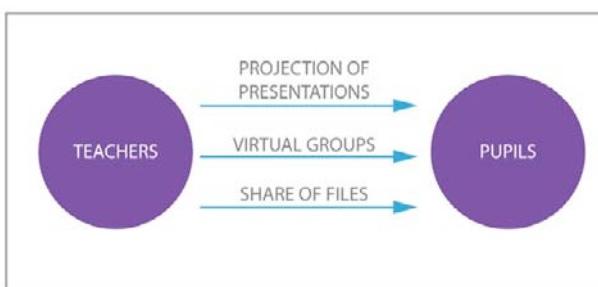

FIG. 4. PERSPECTIVE OF THE UNIDIRECTIONAL INTERACTION OF THE TEACHER VIS-A-VIS THE STUDENT AND THE DIGITAL TECHNOLOGIES IN THE CLASSROOM.
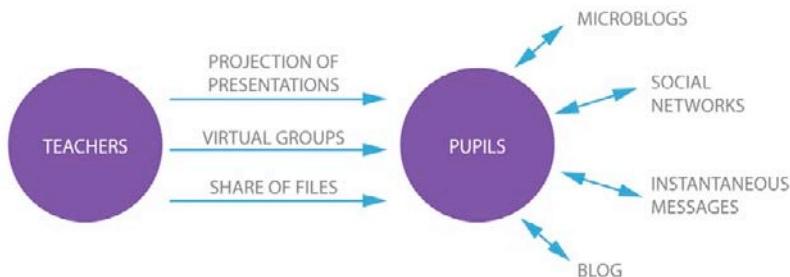
FIG. 5. PERSPECTIVE OF THE MULTIDIRECTIONAL INTERACTION OF THE STUDENT VIS-A-VIS THE TEACHER AND THE DIGITAL TECHNOLOGIES IN THE CLASSROOM.

In view of this context, the need of developing new learning experiences shared by students and teachers in the classroom becomes evident because the current methods establish a conflict among the ways how different generations think, perform and search for knowledge. So, it is possible observing students that do not identify themselves with the teaching methods utilized by the teachers. Aware of this context, the teachers search for inovating their methods by utilizing the means of the digital technologies. In this search, one observes however that in most of the cases, the technologies only replace old tools that repeat the unidirectional teaching that is incompatible with the expectancies of the students.

However, in some activities, the digital technologies already show themselves pertinent to the classroom while they make possible the effective participation of the student in the search for knowledge, collaborate for the process of the student´s immersion and made the class more dynamic and attractive. Considering this reality, in order to occur the change of the experience lived in the classroom in view of the potential of the digital technologies, before that, it is necessary that teachers and students develop methods that consider technology a tool to support the learning process by making it adequate to the reality of the current and future generations of students.

5. FINAL CONSIDERATIONS

The technological evolution of the last decades and its reflex on the way of thinking of the current generation of students make clear the need of changes in the educational sector since the unidirectional teaching model that has been widely used in the classroom has shown to be little efficient for the learning of the students who are used to live in an interactive and dynamic environment.

In view of the above, the current study understands digital technologies as pertinent means to support the changing process of the learning experience in the classroom, in the measure that one has found out that these resources (a) make possible the effective participation

of the student in the search for knowledge; (b) collaborate for the immersion process in the classroom context; (c) are a quick and efficient mean of research; (d) make the class dynamic and attractive; (e) make possible share of information; and, (f) improve the frequency of communication among the teachers.

However, in order that the insertion of the digital technologies in the classroom results in significant changes and not only in the replacement of old tools utilized for teaching, it is necessary that teachers and students exploit together the potential of technology by utilizing it to create a shared learning experience aligned to the frequent social and technological transformations.

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OPEN TEACHING. HOW EDUCATION (AND SOCIETY) HUNGER FOR A DIFFERENT PATH CAN BE SATISFIED

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Education, not only in design, is one of the cornerstones of any form of human association and around its quality, characteristics and evolution is decided the fate of the people this aggregation are part of.

There are some elements of this environment that suggest a possible evolution of this environment: a quick analysis of the development of knowledge sharing with digital networks suggests that the ability to search for data and the instant communication are the keys to this success but it is clear that a communication network is not enough.

It is necessary to find another key element that the industrial revolution has partially hidden from view: the ability to share what we know, to have it transformed by others, in order to make it evolve.

The scientific communities have been the engine of this kind of innovation and are certainly the place where the Internet cultural revolution can find room for action. A process that needs to be analysed to verify whether to adopt it or not.

This analysis will be focused on:
· usage rights;
· means of sharing and participation;
· revision of old roles and new roles;
· cross-roads methods and disciplines;
· publication strategies;
· industrial fallout or social impact. Why not both?

We aim to investigate which are the operational directions to be taken, but above all the tools, mainly cultural, to use for the arrangements to be introduced.

The university is inherently a place where the formulation of new responses to new demands is an ideal space for experimentation and dissemination.

This concept is even more applicable in times of crisis when human aggregations are living in turning points, where long term strategies can give positive answers to the issues rather

than hasty and particular solutions, often rooted in the same mistakes because of crisis.

The economic, social and political global difficulties that characterize the beginning of the twenty-first century, have deep ties with a structural trouble, particularly evident in Western cultures. The reference model since the dawn of the industrial revolution that is the way we think the economic development, has shown its hard limits which, put in place globally, generate imbalances never occurred before.

These imbalances also occur in a very clear manner within the communicative structure that every country has adopted, even those who have traditionally used stringent, if not dictatorial ones, criteria control of information exchange.

In this situation, there is also an overlapping phenomenon, not yet clear, but intrinsic in the technological revolution that is the basis of the aforementioned massification of communications, which resides in the evolution and acceleration of computational capabilities of the computer processing systems that permeate every corner of our daily lives.

It consists, as theorized and named the *Singularity* by Ray Kurzweil, in the moment when the ability of computers will exceed the humans one and will merge with it to form a new type of intelligence not exclusively biological.

This definition may seem to be brutal to an instinctive first step analysis, producing strong feeling of rejection, especially if we think about some of the apocalyptic visions that literature and movies have accustomed us to envision an hyper-technological future.

However, a more closer reading can tell us that the danger of a drift is not really specific to the Singularity itself, and that today we do not realize we are already taking daily behaviors we can not exclude they would not bring us to a not so different future than the one speculated by Kurzweil.

In fact what is happening today in the digital world, thanks to the information infrastructure systems and habits we have adopted is making us have a different perception of what we do and what we make computers do for us or, very more often, instead of us.

Trying to make a simple exercise we can imagine a hypothetical day of Mr. Mario using technology in a conscious way like other billions of people around the world.

Our Mario uses a smartphone, with which he communicates via voice, text, images and videos with people he shares his time with daily, takes pictures, manages his calendar and address book contacts, connects to social networks where he shares part of what he does with virtual "friends". He drives his car using the navigator integrated into the phone with which he planned destinations, obtaining routes and travel times. He booked a dinner at the restaurant and bought a theater ticket, and while walking through the city he receives business information close to where he is from his favorite social network app, thanks to built-in GPS in his phone and the triangulation of his position with the cells the mobile telephony. Another app allows him to recognize a piece of music heard in a public place, even suggesting the purchase in a store nearby. At the end of the evening, before going to sleep he set the alarm alined with the first task scheduled on the agenda for the next day.

Agenda synchronized on multiple devices through the network services offered free of charge from his provider.

All these behavior are normal activities thanks to the existence of an infrastructure consisting of networks that are operated by companies, which provide reciprocal access to the transmission and processing of data that users, through the applications send and receive second by second.

The fact that these often personal nature data are moved around the world in ways that only three decades ago we would not have imagined nor have even allowed, is now considered normality. Not surprisingly indeed, because having personal related data in "the cloud" is seen a positive and very useful opportunity since Cloud Computing is now a well established tool. Whose potential, however, we have seen a very tiny fraction of yet.

To make this possible we must consider the structure of the Internet and the way it is evolving: a network of computers that not only exchange data but store them in a diffuse way (perhaps do we know where our gmail message has been saved? and what about the digital location of the beautiful pictures taken today and saved in our DropBox? Above all, do we know if, how and who has access to that data?) and rework them with multiple computers parallel processing (in cloud) giving them back to us exactly the way we wanted, in form of emails, text messages travel routes or whatever else.

We can therefore say that some form of the future of integration between men and machines is already in place, because we are farther away from the position of being able to live without the use of technology or, more likely, without a deep integration with them.

This prompts an obvious question: since it is clear that we can not afford, or even better, we do not want that the Singularity will manifest itself in a malicious form, what can we do today to make this forthcoming revolution being hopefully positive, rather than the first step to humanking extinction?

To find the answer we must return to the keystone of the digital revolution, ie data and a concept that seems to take on ever greater significance to the extent that is increasingly missing: awareness.

These two elements are in fact a summary of what we are in modern form: individuals that produce, release and share instantly information, which are the basis of knowledge, which consists in the specific attitude of human being, individually and in groups.

Looking at data, however, very quickly shows a heavy problems with rules, which we have developed for almost three centuries as a result of the industrial revolution, making us managing what we know and the way we develop new forms of knowledge; doing this we encounter a lot of issues of industrial rights protection, creation and in general in the world of copyrights and patents.

Even leaving aside the paradoxical and more or less famous historical cases well described by Charles Gubitosa, we can not avoid to underline the fact that there are many cases that show how the protection of rights provides much food for thought. Without wanting to

turn this analysis into a partisan fight between good and evil, there is no denying that the approach exclusively based on protection above all other considerations, is experiencing a moment of escalation; it is clear that this is happening especially since dissemination of information has become pervasive and global.

The high-profile cases that highlight this situation are numerous and are internationally important, due to the nature of the phenomenon.

The years of the beginning of the millennium have in fact seen legal battles for the closure of sites that allowed the exchange of music and video between users with P2P tools (Napster, 2001), cases almost surreal if not alarming as the patenting and deriving protection against unauthorized use of a particular shade of magenta (Deutsche Telekom, 2007).

Considering the matter from the economic point of view, moreover, we understand what is one of the most limiting aspects of an approach based on the possession of rights rather than on their spreading: in 2011 Apple has spent $100 million in lawsuits, an amount of money that could suggest an excessive exposure also considering the scarcity of results obtained for only a small percentage of cases won by the Cupertino giant. However, consider that this figure is only 1/460 of the turnover of the 4th quarter of the year for Apple, since this amounted to 46 billion dollars.

The fact then that has not achieved much in won cases is not important for the company, since putting in place the causes is enough to deter the counterparts to face the lawsuit. The deterrent effect of the cost to defend themselves in lawsuits with giants such Apple is often more than enough to deter those who can not afford to litigate. In this sense it is exemplary the case of the blog cocacolla.it which in March 2012 has closed its doors after receiving a very much explicit and irrevocable request to do so by Coca Cola. The site managers, who also had no kind of similarity on the market of the multinational, have not only had to close the blog and where possible eliminate any reference to it but they also had to give free rights of the domain name to the multinational.

Underlining again the fact that these references do not have any purpose other than to describe some relevant case studies and that there is no problem in the intrinsic right to protect what derives from the intellectual activity/production of someone, it seems interesting to see how digital globalization makes the phenomenon of protection appearing abnormal in some situation. It is obvious that in a global community, the protection of an industrial or creative content can be pursued only by those with huge amount of immediately available cash resources, putting in actually only these people in the position to proceed and leaving all other just the ability to act locally. This is a matter that in a global community has not any effect other than just growing costs without any significant returning profit.

Another sign of the different conditions in which we presumably will find ourselves in the commodities market of the next years, is suggested by the emergence of increasingly important technologies of *rapid prototyping and manufacturing.*

These new methods of manufacturing, already widely adopted in many areas of design

and production allow the creation of physical objects from virtual three-dimensional data, effectively avoiding the goods transportation translating it almost exclusively in the data transfer (the raw material is still necessary even if you can act locally with greater ease for its retrieval).

This approach, already productive for itself, can undermine the structure of markets, transport and economic balance with the only re-localization or resizing of production facilities. As others have noted (Bruce Sterling with his spimes) will rise from a global production market to a local, first, then subsequently personal, allowing anyone to purchase a virtual product virtual "printing" it three-dimensionally at home.

In addition to this obvious aspect another peculiarity is added, however, inferable from what happened with music and movies, that is the strong likelihood that a production method of this kind, based on the transmission of data, allows the possibility to disseminate the information worldwide through peer to peer networks.

This scenario obviously quite critical for those who produce data, highlights again the need to search for a different new paradigm looking forward for an effective solution to the problem.

If these are already sufficient reasons to enable arguing other ideas, there is another much more important, even if less immediately tangible, which is the intrinsic characteristic of the knowledge, growing only when it is transmissible and transformable in a non-linear systemic way. Enclosed in a place, whether physical or virtual, and isolated from mankind, it has no way to evolve and become instrument of development.

For these reasons a change of strategy seems particularly urgent; that could give new impetus to development through the establishment of new management paradigms of what we create with our own intellectual and production activity.

One of the most interesting scenarios of this sort is offered by the information technology field itself, where the late '60s of last century was born, within the hacker culture, but not limited to, a different way of approaching the issue, which for the field of software development and hardware it seemed critically important: the of Open Culture philosophy.

From this approach, essentially characterized by the release of free knowledge, opposed to the concept of protection and closing the content, is immediately born the concept of Open Source, combination of words identyfing a method of releasing free software, including source code (the heart of the creative product, and container of the rules regulating the software itself, de facto the primary secret of the software industry).

This approach, definable much more strategic than merely technical, has still its creator and promoter in the person of Richard Stallman.

Often seen, however and although not without reason, a revolutionary approach to the limits of acceptability, it has found its place in time today, being applied in many areas quite different from the computer field one.

Definitely relevant are certainly cases where Open Source has allowed us to give economic

space to major companies such as Red Hat and Ubuntu Foundation, but what is most striking is the vividness with which small and medium sized businesses around the world have adopted this approach because of the visibility deriving from spreading in a viral way what they do.

In fact some of the critical characteristics typical of the traditional closed approach are removed with the release of the knowledge freely, which is not like, as Stallman says, free as in beer but is like free as in speech, meaning that in the second we are allowed, and expected, to reuse, dismantle, analyze, modify, reuse and redistribute freely.

Inventing, for example, a new system for kinematic connection between an electric engine and the wheels of a vehicle which markedly improve the efficiency would be liable to patent but easily applying this case to a small company or an individual designer would mean put that person or factory in the position of having to take legal action against those who, perhaps on the ther side of the world, will grab the industrial secret making their own version of it, perhaps even in a country with a patent law incompatible with the one of the original designer's country.

The complexity of this situation and the resulting unsustainable costs and time commitment would make its implementation unlikely.

We could argue that the eventual release of industrial secrets in question certainly would open a market of low-cost copies of the system, putting the original author economically on its their knees; ignoring the fact that this scenario would be applicable, albeit illegally, however, even in patent case we can say that this is true if the only intent is to profit from secret itself rather than from the expertise that generated it.

Instead of trying to imagine a different scenario, where the designer publishes the idea online and makes it available to everyone, it could happen the case in which the creative product, no longer secret, becomes a vehicle for spreading the skills of the designer, who would become instantly and globally known primarily as the author of the idea, but especially in the second round as the one who presumably has the skills to do it again.

The scenario, not hypothetical, much less magical, is otherwise quite concrete: the case of Arduino is one of the best examples of how a hardware and software platform, bundled with the specifications for reproducing it, has not generated a plethora of copies by mysterious oriental countries and the authors Massimo Banzi and David Cuartielles did not have to invest any percentage of sales to ship lawyers around the world in pursuit of thieves of ideas.

On the contrary Arduino is in fact the reference for many sectors using control systems and management of equipment rather than data acquisition or multimedia installations.

Another particularly significant case is the Golcorp inc. one, a mining company that in late '90s of last century, through the release of free geological data of a major gold-bearing area on which it was working, was able to identify new areas through participatory activity of hundreds of thousands of scientists around the world; these for their part have been

made aware of information that traditionally never even considered for release by the precious metals mining industry, being considered their most valuable asset, even more than the extract itself.

The scenario described so far, however, lacks an essential element: the culture of the Open and its application may be disseminated in a structured way? And if so, how?

The key once again seems to be the culture and its vehicle, ie those who produce and spread it on the territory. Beyond this element there is the human subject, which again becomes the pivot around which, freed the scene from the exclusive value of the product, rotates the scientific and cultural phenomenon of the production, ie knowledge.

The university has always been one of the first places to experience in didactic what the research processes, thanks to the intrinsic link between the two worlds and as a shared place in physical space for culture and its development. In the field of industrial design, this symbiotic relationship is expressed even better by virtue of the specific characteristics and the fact that it is multidisciplinary.

This feature puts the design in position to challenge to experiment and test new methodological approaches such as the Open one.

To do this we must first define a scenario and then establish rules and identify tools.

Fortunately, these needs can be met immediately because rules and tools are already available, but what is lacking is the specific academic testing.

The rules must drive the process of generation of new knowledge with an Open approach: the formation becomes therefore a time when the fruition of knowledge is obtained through use of sharing approach in an open system of connections similar to the process output-input typical of nature biological processes. The products of this process, similarly to the previous step, are then released in an open way to be disclosed but certainly even more usefully modified, implemented and redistributed; a process which is then at the base of the evident "evolutionary" advantage of the Open strategy.

The tools are the possibility to protect the creative work, the students for first and then the academy, so that the source is identified throughout its travel following the work outside the field of education.

This requirement may be satisfied through the use of Creative Commons licenses, legally binding instrument of assignment of rights with an open approach that includes on one hand the identification of the author and on the other the ability to change the creative product freely but keeping track of all the interventions, and authors, which came into play time by time.

Other instrumental element must meet the need of a new approach to the design process itself. The site of the project, namely the workgroup, real hotbed of new knowledge, requires tools method for open discussion and implementation across the board with a multidisciplinary approach, not based on a hierarchical structure that sees some predominance over other disciplines especially in the preliminary phase of investigation work.

In this sense, the Open Space Technology method, used in organizing complex decision-making processes within numerous working groups provides an open method in which all participants can contribute equally to the project by making available to everyone the opportunity to argue, to introduce elements and check the final results.

Regarding the latter ones, which are then what we would expect from teamworking path, the problems of the traditional publishing systems can be overcome with the use of Open Access

Publishing, whose use is spreading in the academic community and which, if made aware of all the actors involved, could be a new vehicle for the proliferation of open culture in education and research.

Downstream of this analysis there is the need to test all the above work; to do so, the Master of Science in Ecodesign of the Polytechnic of Turin, has introduced this approach in the Virtual Design course in the academic year 2011/2012.

The methods used include:
intensive use of online tools for sharing and participation
• adoption of open source tools for digital content creation
• visibility and partecipation to the working progress with an open blog
• adoption of Open Space Technology
• release of the final students creations licensed under the Creative Commons
• publication of results in Open Access Publishing

The projects will consist, for this first year of experimentation, in digital images and videoclips focuses on the concept of Open allowing the course to narrate itself after the experimentation.

The results are expected by the summer of 2012, and they will be tool for verifying the the project and help students and researchers to understand whether and how this methodology can be applied in other fields of training, like the other courses of Design of Politecnico di Torino.

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STRAND 3
RESEARCH FOR EDUCATION

SEWING GEOMETRIES, POSSIBLE MUTATIONS:
A STUDY ON DESIGN AS A PROCESS

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Considering empirical and craft procedures as qualitative instruments to design, this approach has its focus on practical experience. Tracing the idea of difference in repetition and based on the possibilities of variation inside the limits of rule, it investigates boundaries and freedom between these limits. Using a simple procedure, the sewing of modular geometric forms cut on woven fabric, some arbitrary rules were fixed and some parameters were considered in order to make flexible other variables. A first set of 35 pieces was sewed, starting with simple forms that gradually became more complex. Then other series were sewed, generating more variations of the same geometries. Transformations were observed and documented providing a "catalogue" of forms related to three-dimensional volumes. Through a selective process in which decisions come from the action of the hand and reaction of material, rules are tested, their limits are tested and variation allows standards to unfold. Design transforms and organizes material while the rule auto-generates itself.

••• Geometry, experimentation, process, mutation •••

This research is a "work in progress" and an experimental research. The intention of this work is to assure and promote craft procedures and experience as significant instruments for teaching, research and construction of knowledge in design including professional practice and project in design. The idea of design "by doing", as a possibility of agency and transformation, where low technology can corroborate to high technology, creating strategies for structures and generative tools. The main objective is to instigate potentialities

instead of dictating standard solutions or establishing statements for procedures. The aim is to confirm and validate experience and craft procedures as important tools that can corroborate with design, suggesting directions, enlightening processes, allowing the unforeseen. Based on a specific practical experience this approach has interest in the possibilities of variation inside the limits of rules. Discover which volume result from (or is hidden in) each geometric form is the pursuit of this research. Seeking for "equals different" and tracing the idea of difference in repetition, investigates the boundaries between limits and the freedom that emerge from them. The intention is to pursue the idea of mutation and the capability of transformation of both material and form. The main interest is not in the final result but in the awareness of the process.

METHOD

If from one side this experiment presents a very methodical procedure on the other hand it responds with the freedom of not willing for a prior answer. Although theory was an important reference and a strong influence, the approach adopted in this work was mainly practical and experimental, combining theory and practice through analysis and reflection. The main *corpus* of this research was achieved by action, observation and consciousness of design process. Regarding the method, it is important to stress that some parameters were considered and arbitrary rules were fixed in order to admit and make flexible other variables. It was chosen a simple procedure: the sewing of "programmed" modular geometric forms cut on woven fabric. The sewing acts like a simulating agent, a kind of welding or fastening device. It is an efficient malleable resource capable of promoting connection between parts. It forwards continuity and also allows relations and joints. Being a procedure used as much in craft tradition as in industry, it implies on a sequence of steps and tasks, however even when it is used in serial production the activity of sewing continue to be a craft event usually mediated by the use of machines.

Materials represent an important and determinant aspect of design. Each material has its proper vocation and behaviour engendered by its own properties. These properties can interact with design as partners of the outcome. The "base material" selected to be used in this experiment was a woven cotton fabric called *Morim*. It is a common white "plain weave" textile constructed on a canvas structure that comes on rolls of 50 meters long and 70 centimetres wide. Lightly transparent, it is an inexpensive cloth that is frequently used for *Draping* and pattern studies. It is a flexible, pliable and light material with the capability of shaping complex surfaces. Suggesting investigation, allowing experiments and favouring the discovery of forms that wouldn't be usually or easily imagined, prior or rationally foreseen. For being malleable, textiles have the property to adapt and configure different "topographies", like declivities, slopes, protuberances, rugosity, volumes, cavities and angles. The concept of modelling is related to the idea of generating volumes, moulds or reproduction of three-dimensional forms. There are some interesting aspects about this issue to

consider when using textiles and non-rigid surfaces on not necessary flat situations, as mod-elling organic forms and covering "an" irregular body where straight lines and right-angled relations occur only deliberately. Apparel production and design, like pattern construction and Draping, are in common ground regarding the effects of tension, cuts, folds, ribs or pleats. Considering the assemblage of parts, in order to set in perfectly and get adjusted to each other, the edge of each segment must be connected to another one of the same measure, even if their shape (geometry) is different. Sewing and gathering concave forms to convex ones, joining straight edges with curved parts or surrounding straight angles by continuous or curved stripes can originate and reveal interesting topologies.

According to a sequence of actions guided by pre-established data, transformation and effects appear like a parametric process based on analogical actions. The principles of pat-tern making can be adopted and transferred to other uses and situations. Two-dimensional patterns present and generate three-dimensional forms, three-dimensional volumes can be unfolded into plan patterns.

SEWING GEOMETRIES

The experiment started with aleatory simple forms that gradually became more complex. Initially a first set of 35 pieces, called "neutral" series was sewed. Parameters were set, adopt-ing some "concrete" conditions, in accordance with limits and dimensions presented from material. It was established a module (M), considered as the "Original Matrix", generated directly from the width of the cloth (70 cm).

M	"Original Matrix"	$= 70 \times 35$ cm (w1 x h)	ratio 2:1
MB	"Basic Module" (Mw1/8)	$= 8.75 \times 35$ cm (w2 x h)	ratio 1:4
Mh/2	....	$= 17.50$ cm	
Mh/4	$= $ MBw2	$=\ 8.75$ cm	
Mh/3	....	$= 11.666$ cm	
Mh/8	$= $ MBw2/2	$=\ 4.375$ cm	
MBw2	$+$ MBw2/2	$= 13.125$ cm	

As explained before, just from the beginning, some arbitrary parameters and "rules" were fixed and considered temporarily immutable: each final piece had to be composed using always six equal parts (modules); every module, independent of its form (geometry), should have the same base dimension (w2 $=$ 8.75 cm) and the same height (h $=$ 35 cm); each proposed geometry should have its construction lines guided by proportional relations origi-nated from the "Basic Module" (MB).

Along the process, as illustrated in the images that follow, subsequently changes (some subtle others more radical) were done in the geometry of the modules of each piece to come, leading to "intentional" forms and not only "resulting" ones.
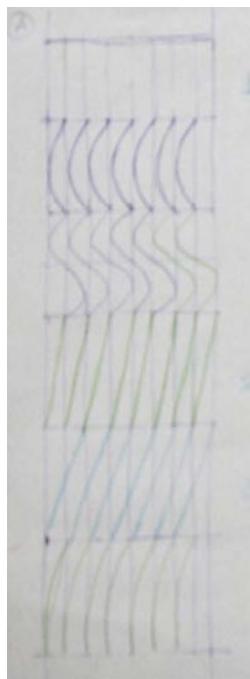
FIG. 1. SKETCH OF STUDY FOR SOME GEOMETRIES. THE DIVISION OF CLOTH IN 8 EQUAL PARTS FOR THE USE OF ONLY 6 MODULES. THE LATERAL PARTS WERE SET FREE IN ORDER TO ALLOW CHANGES AND VARIATION OF DESIGN ALONG THESE STRIPES. THE IDEA OF "MUTANTS" OF THE SAME PRINCIPLE.
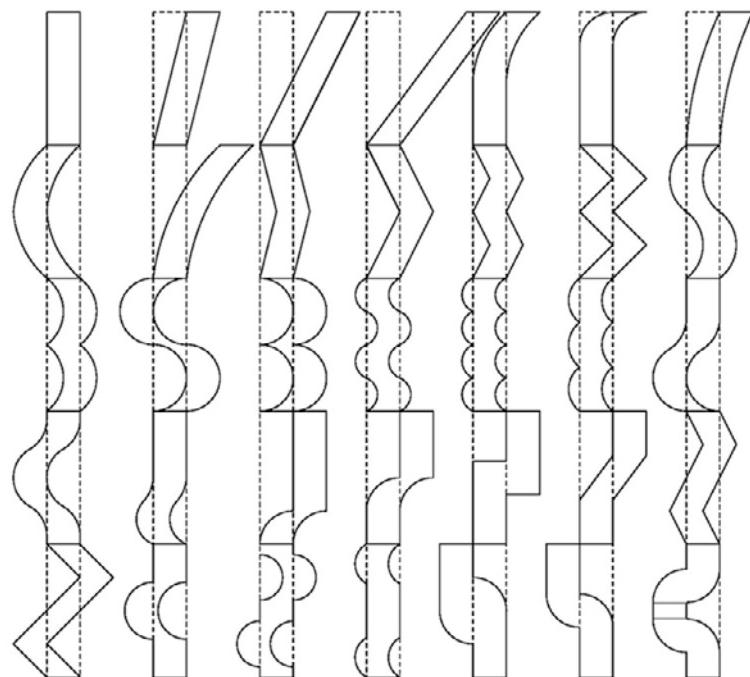

FIG. 2. SEQUENCE OF 35 MODULES ORIGINATED FROM BASIC MODULE (MB) BASE = 8.75 CM / HEIGHT = 35 CM

FIG. 3. "NEUTRAL SERIES" - FIRST SEQUENCE OF 35 PIECES SEWED USING 6 IDENTICAL MODULES EACH.
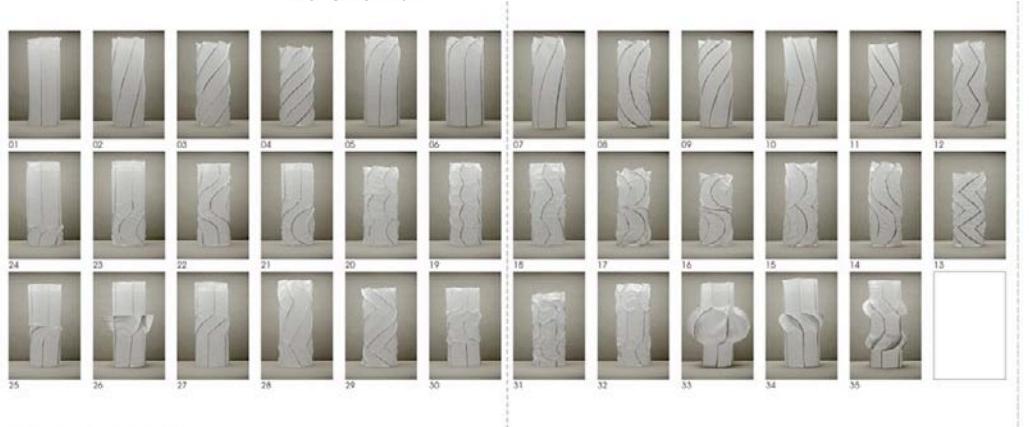
SEWING GEOMETRIES

DESCRIPTIONS AND COMMENTARIES ABOUT THE UNROLLING OF THE EXPERIMENT

#1

The "Basic Module" (MB) is the reference and the starting point for the whole process. The first piece to be assembled was very simple. It was built (sewed) using six equal rectangles (MB = 8.75 x 35cm). The vertical sides (h) were joined (initially in pairs and then connected all together) forming a cylindrical volume marked by six straight and vertical "ribs".

#2 / #3 / #4

The next three pieces in the sequence were sewed using modules that had a parallelogram format. Although the (sewed) ribs were originated by straight edges they evolved in curves, suggesting the configuration of a spiral. The degree of inclination of each final rib, in each case, derived accordantly to the shift of position between base and top of each module (#2__1w2 ; #3__2w2 ; #4__3w2, respectively).

* It is possible to notice that there are strong relations between results and the variation of parameters: bigger the shift ⁄ narrower the width of the module (diagonal stripes); shorter the height of the cylindrical final volume; larger the final diameter of the cylindrical volume.

** At this moment, according to the schedule of the experiment, it was programmed to continue the sequence with other different shapes. However, the results gained from this short start "suggested" the experience of trying other pieces with more pronounced angles, for the inclination of the parallelograms ⁄ piece #4 was a try, but the difference in the final volume was not as much visible as expected and it also implied on the use of more cloth than the Original Matrix (M).

*** After piece #4, more possibilities came to mind: about what would happen if the edges of the modules were curved, instead of straight; would they amplify the spiral effect? (see pieces #7 and #9)

**** Should the experiment make a choice for a variety of forms or should it take each possibility of form continuously to its limit? _____ Option was for a start with emphasis on diversity, setting the possibility of "detailing" aside, probably to be retaken on a later moment.

#5 / #6

Related to the same variant these two pieces associate a straight line to a curve on a continuous line, using the shift of one module width (8.75 cm). The curve favours the sense of movement in counterpoint to the static equilibrium of the base. (#5__1/2h straight + 1/2h curve ; #6__3/4h straight + 1/4h curve). Both present a small tightening on the top where the curve ends.

#7 / #8 / #9

These three pieces were constructed using continuous curved lines. Pieces #7 and #9 are

similar to #2 and #3 (respectively) in shift. The curved edges of the modules accentuate the spiral effect of the sewed ribs. They also present a light impression of tightening on the top and bottom of each piece where the curve ends.

#8___ has it curve constructed on a "C" format ⸲ in the centre of this piece there is a stretch of tension and the cloth presents some ruffles in the concave part of the curves; also in this central part, modules appear to have a larger width than in the borders.
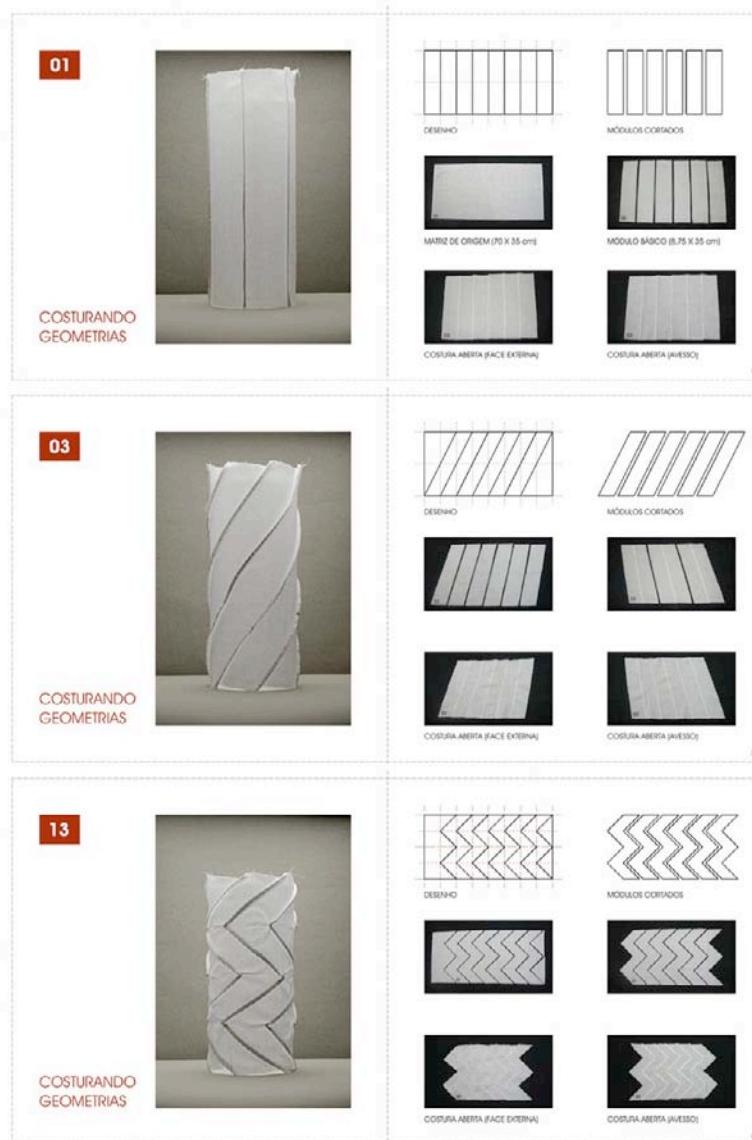

FIG. 4. EXAMPLES AND DETAILS OF SOME PIECES FROM THE "NEUTRAL SERIES".

#10 / #11 / #12 / #13 / #28 / #29

These pieces were all constructed using modules with straight lines edges on "V" and "VV" format. The main thing about this kind of "zigzag" variant is the reaction of the cloth in the vertices of angles. On the inflection points, where the diagonal lines of the edges meet, ruffles are accentuated, like a kind of pinch, sometimes forming small pleats. According to the inclination of the angles compression and tension interact on the surface of the cloth that reflects material reactions. More stressed the angle, more reaction of material and shorter the final height of the piece. (see #13 and # 29).

#14 / #16 / #18

This variant uses continuous composed identical curves. Base and top of each module starts and ends on the same alignment while the sewed ribs, like an "S", undulate between modules. All three pieces are exactly the same, even if turned upside down.

#14__ has one inflexion point (h/2 = 17.50 cm); shaped by two equal inverted curves; curves oscillate w2/2 (4.375 cm) ⁃ ruffles are lightly concentrated on the areas where concave encounter convex edges.

#16__ has one inflexion point (h/2 = 17.50 cm); shaped by two equal inverted curves; curves oscillate w2 (8.75 cm) ⁃ ruffles are strongly spread over the piece; the horizontal part of the sewed ribs became very close one to another (exactly in the centre of the piece).

#18__has three inflexion points (h/4 = 8.75); shaped by four equal alternately inverted curves; curves oscillate w2/2 (4.375 cm) ⁃ ruffles are spread equally balanced along all over the piece.

* Ribs that evolve more horizontally make use of more material (from the module vertical axis), implying on a final reduced height of the piece.

** Piece #16 is one of the most interesting and beautiful pieces of this series. The dress presented on figure10 was based on the geometry of this piece.

#15 / #17 / #19 / #20

This group of four pieces derives from the last variant (#15 from #14 ; #17 from #16 ; #19 from #18). They maintain the use of sequential identical curves, however, not inverted. Each module starts and ends on the same alignment while the curves go forward and return. (#15 and # 17__ 2 curves ; #19__ 4 curves ; #20__ 3 curves).

#17__ Extreme ruffles can be noticed in the centre of the piece. Just from the start, while joining (sewing) its modules, it already presented pronounced "deformities". This group presents aligned inflexion points strongly stressed.

#21 / #22 / #23

Geometry of this group presents association of straight lines with curves that go forward and return, connected on a continuous sequence. The observation and confrontation of the

pieces from this variant, can reveal a certain kind of "offset" of curves that vary along the height of the cylinder of each piece. Reaction of material appears more evidently near the area of inflexion points and curved lines ribs.

#21__ shift of one module width (w2 = 8.75 cm); straight line = h/3 (11.666 cm)
#22__ shift of one module width (w2 = 8.75 cm); straight lines = 2xh/6 (5.833 cm)
#23__ shift of half module width (w2/2 = 4.375 cm); straight line = h/2 (13.125 cm)

* Most pieces are also very interesting on the upside down position.
** Observing #22, automatically appears the inquiry of how it would be, if the central curve could evolve on a diagonal line, using the shift of one module width (8.75 cm) or even two modules width (17.50 cm) ⁄ these two options have not been realized yet.

#24 / #25

These two pieces are derivative from #6. They also associate a straight line to a curve but present an intersection point marked by a stressed inflexion. Both present the same construction, using the shift of one module width (8.75 cm) from base to top. The only difference between them is the offset of position regarding the inflexion point. (#24__1/4h curve + 3/4h straight ; #25__1/4h straight + 1/4h curve + 1/2h straight). The radius of the curve is equal w2 (8.75 cm). Material reveals stressed tension exactly around inflexion point.

#26

This piece is the first to use an inflexion of ninety degrees (90°), in relation to vertical and horizontal axis of a module (#13 and # 29 used, but diagonally). The cutting of its modules implied on the use of more cloth than the Original Matrix (M = 70 x 35 cm). The geometry of the modules presents a shift of one module width (8.75 cm), from base to top, but after its six modules were sewed one to another and the cylindrical piece stands still, this shift is not easily perceptible. In some way, the "saliences" that emerge from this piece reinforce the structure of its ribs and help in the equilibrium of the final cylindrical volume.

* This is the most important piece of the whole experiment. Along the assembly of its modules and its accomplishment, "something" happened ⁄ something completely unfore⁄ seen and unexpected, something "new" ⁄ not an "invention" but a discovery.
** There is no "magic", what happens in geometry is already implicit on each form, but sometimes not evident yet, before the assembling of the parts ⁄ probably someone with enough knowledge of geometry and aware of geometrical implications, or someone more experienced on physical spatial relations, should know in advance or "predict" what was to come. However, surprise is the main reward of this experiment.
*** During the sewing of these modules, a "question" occurred: how to join edges with different geometry? _____ The main thing about this aspect ⁄ apparel design and produc⁄

tion continuously struggle with this question ⁄ is to provide edges of the same length to be joined, independent of the geometry of each one.

**** From this "event", new possibilities came to mind, generating a new group of pieces and suggesting a new path of geometrical forms that could project themselves in space, out of the main cylindrical volume (see figure 3 and commentaries that follow on #33, #34 and #35).

#27

On this piece, the module was divided in three equal parts (h/3 = 11,66 cm). It associates two straight vertical lines with a central diagonal line, using the shift of one module width (8.75 cm). As in pieces #10 to #13, #28 and #29, just in the vertices of angles, material reacts and ruffles are accentuated. In this example, it is perceptible that the shortening of the piece occurred exactly at the central part, where the sewing of diagonal ribs consumed more material (cloth) from the height of the piece.

* Although #27 was assembled before #26, it is interesting to notice that the geometry of its module is just "one step" from the main "transmutation" that occurred on #26.


FIG. 5. MORE EXAMPLES AND DETAILS OF SOME PIECES FROM THE "NEUTRAL SERIES".

#30 / #31 / #32

This variant derived from #24 and #25. All three pieces associate straight lines with curves, presenting intersection points marked by stressed inflexions. Base and top of each module starts and ends on the same alignment. Position, size and quantity of curves, define the difference between these three pieces. (#30__1/4h straight + 2/4h curve + 1/4h straight ; #31__1/8h straight + 1/4h curve + 1/4h straight + 1/4h curve + 1/8h straight ; #32__1/3h curve + 1/3h straight + 1/3h curve). Ruffles and undulation of material reveals stressed tension along curved ribs and around inflexion points, in contrast to flat parts that surround straight ribs.

* Apparently, the six modules that compose the cylindrical volume of piece #31 are very complex and "rigid", resembling the interlocking shapes of a puzzle. However, after sewed, its joints became amalgamated with material effects, revealing another interesting example of the "neutral" series.

** #30 and #32 pieces, are quite the opposite. #30 present curve and ruffles in the middle of the piece leaving flat surfaces to the borders; #32 present curves on the borders contrasting to a flat surface in the middle of the piece.

*** How should it be, if curves were different or if central parts evolved diagonally? _____ These possibilities have not been tested yet.

#33 / #34 / #35

The last three pieces of the "neutral" series were conceived after the complete sewing of #26. It generated a different and new variant that awakened the possibilities of forms that can "protrude" from the main cylindrical volume. From base to top, the geometry of their modules presents a shift of one module width (8.75 cm). The cutting of modules consumed more cloth than the Original Matrix (M = 70 x 35 cm).

* #33 was the first try after #26. Using a curve instead of square angles, its single module appeared to be more interesting than what the final sewed piece revealed. The central part became too "inflated" than expected (what is not a problem).

** #34 is very similar to #26. The smaller and rounded corners of the "saliences" are less evident than in #33.

*** Proceeding on this generative line, #35 was the last sewed piece of the "neutral" series and can be considered as an initial attempt for the quest of more complex events. Although its cylindrical volume does not reveal harmonious proportions or any other novelty, it opens the chance for replicating the matter and fold back upon new directions. Opening conjectures such as: using the composition of many different curves in the same piece; experimenting torsions; risking possibilities to come and go or the simply change of direction; attempts on more organic and irregular forms that can also be projected out of the main cylindrical volume.

**** All measures and proportion refer to cut modules before being sewed.

***** Angles and inclined lines occur differently from plan to volumes in space.
****** Square and sharp angles can generate effects completely different from curved inflexions or rounded corners.
******* Analysis associated to awareness of consequences, work as powerful tools.

SEWING MORE GEOMETRIES

Along the process on a systematic investigation, results, effects and transformations were observed and documented providing a "catalogue" of forms related to three-dimensional volumes. The taxonomic character of this work must be seen as an effort of apprehension of a process that is more fluid than our senses are able to attain. For each piece photographs were taken, drawings in CAD were done and plans and schedules were organized for the whole program. Quite automatically each piece led to another one on an endless "route" of incessant possibilities.
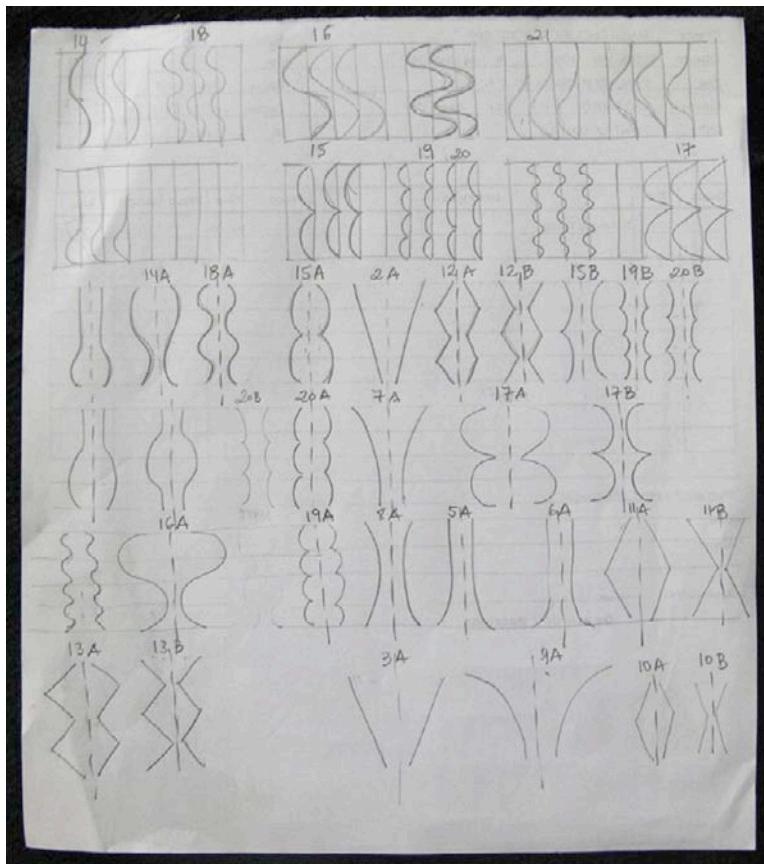
FIG. 6. SKETCHES FOR "A, B AND C" SERIES, USING THE SAME GEOMETRIES OF THE "NEUTRAL" SERIES, CONSIDERING THE POSSIBILITY OF MIRROR (FLIP) THE LINES THAT DEFINE THE EDGES OF THE MODULES.

Replicating from the "neutral" series, quite as an immediate consequence, other three series "A", "B" and "C" emerged and were also sewed, generating more variations of the same geometries.

FIG. 7. SOME EXAMPLES OF PIECES FROM "A" AND "B" SERIES, HALF SEWED, BEFORE BEING CLOSED.

As said before, while procedure of sewing acts as a kind of welding, woven fabric is a flexible and pliable material with the capability of shaping complex surfaces. All the geometries of this experiment were conceived on flat plans. Inflexions, curves and straight edges can be accordantly joined while small pleats, tensions and folds, configure the skin of each "objectil". The three-dimensional trajectory of sewed ribs derives from its own path, unfolding in space, as a consequence of its geometry.

The "neutral" series "A", "B" and "C" are not completely documented yet but they reveal a complexity of forms, volumes and effects much more interesting than the "neutral" series (that kept generating mainly cylindrical forms with some variation on height and diameter, presenting diversity of tension and textures).
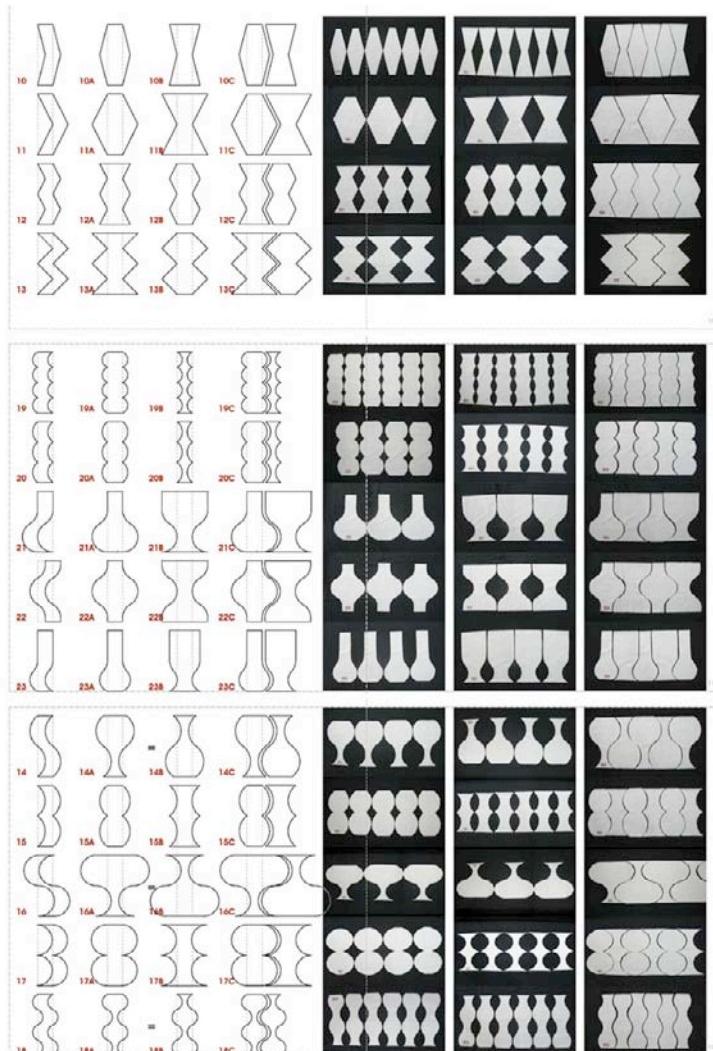

FIG. 8. SCHEMES FOR "A", "B" AND "C" SERIES. WE CAN SEE THE ORIGINAL MODULE FROM THE "NEUTRAL" SERIES, THEN THE MODULE FROM SERIES "A", THE COUNTER-FORM MODULE FROM SERIES "B" AND THE ASSEMBLE OF A+B THAT COMPOSE SERIES "C". IT IS POSSIBLE TO NOTICE THAT IN SOME CASES, THE MODULES FROM SERIES "A" AND "B" ARE THE SAME, BUT ONLY INVERTED.

This is a "work in progress". It started some years ago as a personal experiment on sewing aleatory geometrical forms. It started to become a "serious" and methodical job during a post-graduation course on Graphic Design and now it is going to be continued on a master's degree in Design and Architecture. Shimmering to be extended to other materials and procedures and always seeking for the same approach: the ambition to search for "equals different", tracing the idea of difference in repetition, chasing for mutants of the same principle.

In the course of last years non-Cartesian forms and non-Euclidian geometries have been used and explored more and more configuring everyday objects and spaces. The possibilities and relevance of computational design and digital fabrication as powerful and important tools for essays and design projects and for modelling and generation of forms cannot be ignored or denied. The option of working with changing parameters and algorithmic procedures on an analogical way is a strategy of consciousness trough a selective process, where decisions come from the action of the hand and reaction of material.

The concept of mutation comes from studies in the field of biology and the context of natural sciences, more specifically from botanic and genetic biology. Contemporary philosophy embraces the idea and amplifies its meaning and extent. Defined as a permanent change (of genetic material) can be caused incidentally or by induction. Considered as an irreparable "damage" this "transmutation" implies on a permanent and generative replication. The idea of mutation as an event that originates qualitative or quantitative alterations and implies on a certain kind unavoidable heritage, contagion or dissemination, can reveal aspects and possibilities that are interestingly suitable for the teaching of design, for the practice of design and even in specific moments for project methodology of design.

Although this experiment was developed as an academic work it can be transposed beyond the limits of education and esthetical or formal exercises and conjectures. Its principles can be applied for practical or professional uses considering different technics or materials even thinking on the circuit of industrial production. Considering any specific procedure, knowing its process, conditions and limitations, small or subtle changes can be proposed in order to take the risk or "enjoy" the possibilities of mutation.

From control to the unforeseen or from chaos to control, the rule auto-generates itself. Contrasting the rigid forms of geometry to the flexibility of fabric or, paradoxically, contrasting the abstract character of geometry to the materiality of fabric. On a constant auto-review process, guided by limits and freedom, the planning and building of this work revealed itself along its own journey. Leaded by a "dialectic" relation between fixed parameters (measures, modules and repetition) in opposition from the endless possibilities of variation, the embattle between agency and agents, design transforms and organizes "materia", while its properties interact with design, on a constant unfolding process. Rules are tested, their limits are tested and the variation inside the rule allows standard to unfold.

"La main est action: elle prend, elle crée, et parfois on dirait qu'elle pense. Au repos, ce n'est pas un outil sans âme, abandonné sur la table ou pendent le long du corps: l'habitude, l'instinct et la volonté de la action méditent en elle, et il ne faut pas un long exercice pour devenir le geste qu'elle va faire."

(Focillon, 1943)
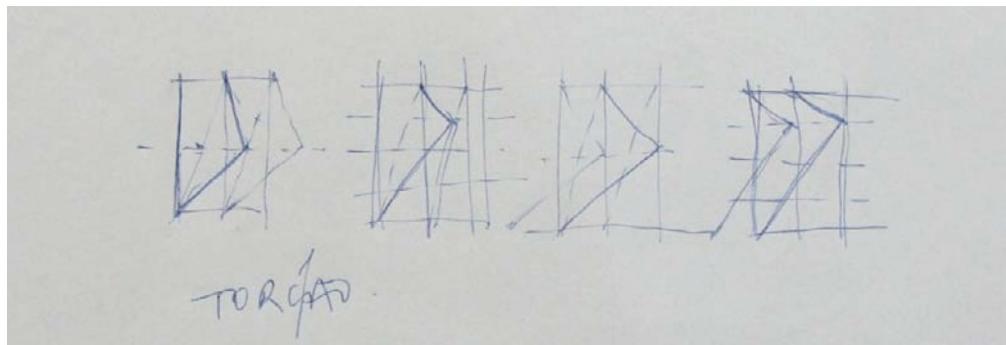
FIG. 9. SKETCHES CONSIDERING DIFFERENT POSITIONS OF THE SAME GEOMETRY.

FIG. 10. DRESS CONCEIVED AND SEWED USING THE SAME PRINCIPLES AND PROCEDURES OF THIS WORK.

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THE INTERNATIONAL DOCTORATE IN DESIGN AND INNOVATION: A MODEL FOR EUROPEAN-MEDITERRANEAN EDUCATION AND RESEARCH[1]

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The contribution has the intention to describe the development and articulation of the International Doctorate in Design and Innovation, an innovative third level educational model in the field of design. The International Doctorate is also an European-Mediterranean network of education and research in design, characterized by a strong experimental approach, directed towards emerging economies, including Latin American nations. The proposed educational model is developed through a dynamic, multidisciplinary approach, defining an original and innovative pathway with the simultaneous effects of research and education as valid intervention tools.

••• Product innovation; process innovation; creativity; network; multidisciplinarity; knowledge •••

WHY AN INTERNATIONAL DOCTORATE IN DESIGN AND INNOVATION

Daily confrontation with emerging economies highlights a substantial divide between the extensive European productive tradition, supported by solid cultural foundations. These same foundations are nevertheless still anchored in older schemes and logic that limit the ongoing transformational process and the more dynamic approach that characterizes

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[1] The paper is a joint effort of the authors. The first paragraph entitled *Why an International Doctorate in Design and Innovation* was written by Mario Buono while the paragraph *A model for European-Mediterranean education and research* is written by Silvia Pelosi. Therefore the paper is the result of consideration and research conducted with the students XXVI and XXVII of the cycle of the Ph.D. program in International Design and Innovation, Giuseppe Vaccaro, Giulia Scalera, Chompoonut (Natasha) Chayaamor XVI cycle, Pasquale Salzillo, Mara Rossi, Beste Ozcan and Hande Ayanoglu XXVII cycle. In particular the graphs have been treated from Giulia Scalera and Giuseppe Vaccaro - *XXVI* cycle.

emerging countries. This confrontation makes it necessary to implement collective initia-
tives able to redirect policies in the areas of development and innovation, at the same time
bridging the gap between science and the marketplace, favoring transformation in the
invention of products.

The causes of the innovation difficulties that afflict particulary the euro-mediterranean
system and the failure to initiate appropriate policies in regards, is compounded by the
inability to implement immediate or short term innovative processes, not to mention the
time required to configure worthy and creative processes that would lead to a strong focus
on product innovation, services and processes for the enhancement and growth of the
production sectors.

In reference to Euro-mediterranean areas, the need to renew production systems with the
aim of competing on the international scene requires a methodological approach which
not only encompasses the systemic integration of diverse skills but which also responds
to the need to incorporate and make use of talent. This crisis is forcing them to renew
their systems and processes, which also extends to vocational training intended to equip
people with the skills they need to support manufacturing systems and guide businesses
towards change, and a knowledge-based economy. More ten years after the Presidency
Conclusions of the European Council (Lisbon 23 and 24 March 2000) whose stated ob-
jective was the transition towards a knowledge-based economy and society to be achieved
through targeted investment in research and innovation, many Mediterranean countries
are only just embarking on a process of growth to achieve these aims.

The Mediterranean region in particular, as a bridge between North and South, still has to
produce its own programmes and concrete answers, and is thus at a disadvantage within
the European Community compared to the countries of Northern and Central Europe.
The role of the Mediterranean is often marginalised when it comes to the EU's develop-
ment policies, among other things.

At the same time, research centres and universities are losing their powers of attraction
when it comes to research and development, due to shortage of courses geared to meet
new demands, and the lack of dialogue with businesses and local governments. There is
thus a pressing need for a more profitable collaboration among businesses, universities,
research centres and local governments, including joint research projects and innovative
courses with the specific aim of developing young researchers' cultural and scientific skills
through specific multidisciplinary projects, and of meeting industry's need for updating
and valorization. To kick-start this process, cooperation policies must be pursued, among
local systems (universities, local authorities and businesses) which should be thought of as
communities, by sharing experiences linked to research and innovative training models.

Therefore, in line with the need for renewal and transformation of processes of knowl-
edge generation and transfer, the European Program Erasmus_Mundus - 2009-2013 was
founded with the specific objective of promoting structured cooperation between Euro

pean and non-European universities, creating high level educational opportunities with distinctive European added value, focusing particular attention to the creation of centers of excellence with international character.

Starting from the Erasmus Mundus Program, and in line with the initiative of the European Commission incentivizing research in the fields of design, with innovation playing a key role in the disciplined research, the model of International Doctorate in Design and Innovation course was also developed with the objective of contributing to the definition of a third level educational model in the field of design distinguished from current European models with Anglo-Saxon foundations

The model of International Ph.D. in Design and Innovation meets the needs described above, by building a Mediterranean network of universities, research centres, businesses and local authorities in Mediterranean Europe, with the specific aim of shaping outstanding figures in the field of design, product and process innovation and other creative disciplines by implementing innovative, multidisciplinary research and study programmes. The aim of these programmes will be to emphasise the creative process, and the development and transfer of knowledge: core elements in achieving innovation. The International Ph.D. in Design and Innovation will be a platform from which shared development strategies can be experimented and implemented, initially among partner regions. Later, they will also be transferable to other contexts, in order to develop innovation using multidisciplinary design instruments, meet the need for renewal in manufacturing areas, and satisfy the demand for high-level training from countries with cultural similarities to those on the South Bank of the Mediterranean and the regions of countries within the Consortium. The Ph.D. course will also give young researchers access to the tools they need to contribute to any manufacturing chain in the world, in both developed and emerging economies. As part of the advanced study pathway proposed on the course, students will acquire a rigorous methodology for analysing and exploring complex modern scenarios, elaborating, developing and implementing product systems, innovative, high-impact projects, identifying new markets and areas of intervention, and creating new business models and spin-offs. They will achieve this using design, creativity and integrated skills, which offer them the chance to contribute to diverse areas of production in an effective, wide-ranging way that will increase their competitiveness on the international scene. The research topics covered on the Ph.D. course will follow a dynamic, multidisciplinary approach, thanks to the skills involved in innovation processes. Compared to traditional study programmes, the course has a more original, broader approach, as the coexistence of research and study is considered to be a valid tool.

The structure of the model is a result of various considerations on the role of research in design, intended as a producer of knowledge in relation to innovation processes, different parties and their roles, and to the system of relations which time and again is established within these processes.

If it is true that today, *the dynamics of innovation is the force that can shift history towards an im-provement of living standards [...] [then it is also true that it can not be a linear dynamic experience, and it cannot be described as a simple succession of causes and effects [...] or as a part of an ideology that can be rationally or completely defined. It is an array of human, cultural, technological, scientific, economic phenomena not measurable as a double entry [...] an ecosystem in which each element is connected to every other*, De Biase, 2009.

Within this "ecosystem", a major role is assigned to knowledge, *in a knowledge-based econo-my, goods are produced using knowledge as the primary fundamental factor. Knowledge is used in pro-duction processes and also as an independent factor, in the form of knowledge provided by people, as well as by objects and services that contribute to the productive outcome*, Rullani, 2004.

The ability to create awareness and use it in the best way is, without a doubt, one of the factors that determine the development and prosperity of an area, so that the area be-comes, as evidenced by Rullani, a "cognitive multiplier", able to contain and propagate all knowledge including implied knowledge, which combine to define its identity, *the knowledge based economy is a flowing economy, which in its propagation, requires a network of areas (territorial systems) on which to rely. The areas organize the complexity in a steady, durable way: the organizational strength and identity of areas allows the flow to be flexible, experimental and swift in the propagation process*, Rullani, 2004.

In order for areas to be able to generate and disseminate knowledge for welfare and devel-opment, they need the presence of one or more generating systems and of an environment that encourages the disclosure processes, but the mechanisms that allow both circumstanc-es to exist are not always clear and replicable. In the so-called "cases of excellence", there is an overlapping of factors such as creativity, ambition, curiosity, willingness to find shared solutions as well as the social and environmental context, method, tools, the network of relationships, infrastructure and its available resources, which are all crucial for the es-tablishment and development of the innovation process, *the animal instinct of the innovator, investment in research, training costs, the flexibility of the workforce, the amount of capital, creativity and imagination, are all important factors for the ecosystem of innovation*, De Biase 2009.

Crucial, to achieving this result, is the relationship between research centers, businesses, institutions and the cultural and values system. An important point within this relation-ship, is the investment and the quality of research and training.

Investing in research in all its forms, as well as in training, in turn means a continuous cycle of creation and transfer of knowledge from the theoretical- experimental field to the applied field, using and improving resources, local vocations and talent. It is an open and complex course, characterized by trans-disciplinariety and a continuous exchange of knowledge and different skills, both decipherable and implicit; *training and research in science and technol-ogy are levers that allow the reproduction of these processes. The production of new methods, tools and strategies for developing training and research is therefore a work priority*, Bertola, Maffei, 2007.

In this scenario, the role of research in design, because of its trans-disciplinary nature, and

because of its link with the industrial world and thanks to the design approach of this discipline, takes on a fairly defined position, *in today's world where everything changes so rapidly, an increasing number of individuals and collective groups are confronted with new problems and opportunities never before experienced. There is an obvious demand for skills and expertise in design; a discipline able to dialogue with all sectors involved in the development processes through a methodology that allows a continuous comparison*, Bertola, Maffei, 2007

The creative and transverse approach to design involves the development of strategies applied by both the world of industrial production and that of research. In this context the local dimension deals with the global system through a permeable connection between nodes - an active and controllable system capable of generating goods and services of international importance, with close connections to the local territory.

In this sense the Innovation Union is one of the flagship initiatives of the Europe 2020 strategy, and the programme of the European Commission defines a strategic approach to innovation. Its objectives include reorienting research, development and innovation polices in order to address the main challenges, while also bridging the gap between science and market as a way of transforming invention into products. To close the gap between invention and production, one of the key points envisaged by the Innovation Union is that, by the end of 2011, the Commission will establish a European Design Leadership Board and a European Design Excellence Label, based also on the indication of the European Union, wich has asked Member States to promote experience and good practice in the area of design as innovation performance and an instrument to provide a competitive edge. Today, ascertainment of the success of this model and thus the demand for professional figures who can implement it, alongside the social demand for a new generation of products and services that are consistent with current economic and sociocultural transformations but are also environmentally sustainable, mean that it is time to take a "quantum leap" and offer a high-quality educational pathway aimed specifically at transferring the competencies required in the design field.

Therefore, the model of International Doctorate in Design and Innovation has been developed in response to need for market innovation, particularly on a European level, the demand for high.level educational offering in the area of the design and, lastly, the initiatives of the European Commission promoting design research, giving this discipline a key role in achieving innovation.

A MODEL FOR EUROPEAN-MEDITERRANEAN EDUCATION AND RESEARCH

The International Doctorate in Design and Innovation was established in 2009 between the Second University of Naples and the University of Malaga (Spain), in the 2010 the partnership was extended to the Technical University of Lisbon (Portugal). In relation to the Erasmus Mundus Programme, the proposal model of doctorate has the dual objective of creating a European network – with special reference to the Mediterranean area – of

universities, research center, local bodies and business revolving around design and well as product and process innovation, while also training people with a highly developed professional background who can provide support to any production environment in order to develop innovative products, systems, service and processes.

The doctorate structure assimilates the powerfully experimental character of the discipline and is proposed as an international multidisciplinary workshop in which young researcher can conduct research projects in collaboration with partner businesses, research centres and trade associations. The aim of the program is to bring young researchers into initiatives that are already under way to define innovative products or processes that can patented.

The model here proposed is the result of a desire to channel the two paths of research and training into a "friendly" and open container, that is able to create strong connections and a continuous offer both in terms of education and knowledge.

The creation of a network connection between companies and international academic realities will allow the activation of a system of relations, involving skills and production realities of a different natures. This will facilitate the construction and integration of a space for collaboration to identify development opportunities, areas of research, design themes, areas for process and product testing. An order designed to overcome the spatial and territorial dimensions, and enable a prompt response to the requirements and changes that come from the outside.

The goal of the network will be to facilitate the circulation of knowledge, ideas and creativity among involved parties, and at the same time, create a system of shared innovation, intended to provide quality research and training and introduce a innovative research-training system.

In such a manner, a flexible and dynamic system would be established, where the involved parties discuss and decide together how to resolve any arising issues, to create a shared project and then separate and join different networks to achieve new goals.

The constant element, in this case, would be the academic institution which in fact has the role, from time to time, of identifying a network of expertise in response to specific requests from different businesses.

THE STRUCTURE

The objective of the International Ph.D. course is to produce outstanding figures skilled in the field of design, product/process innovation and creative disciplines: individuals able to work in any production environment. The multidisciplinary, wide-ranging approach will allow young researchers to find employment in various fields, thanks to their ability to interpret and analyse contemporary phenomena, add value to the production systems of various countries, identify new markets and areas of intervention, develop high-impact products and solutions, interact with a range of skills and finally to translate the know-how and skills necessary to compete on the global market into process and product sys

tems. The multidisciplinary approach will also help to shape professionals who can act as a link between the different divisions of a company that have a more direct involvement in product development (marketing, design, planning and manufacturing.

As was anticipated, the International Doctorate in Design and Innovation was established by the IDEAS (Industrial Design, Environmental and History) Department of the Second University of Naples, in collaboration with the Art History Department of the University of Malaga and the Faculty of Architecture of the University of Lisbon. The following chart shows the pattern of evolution of the phd program and the gradual expansion of the network:
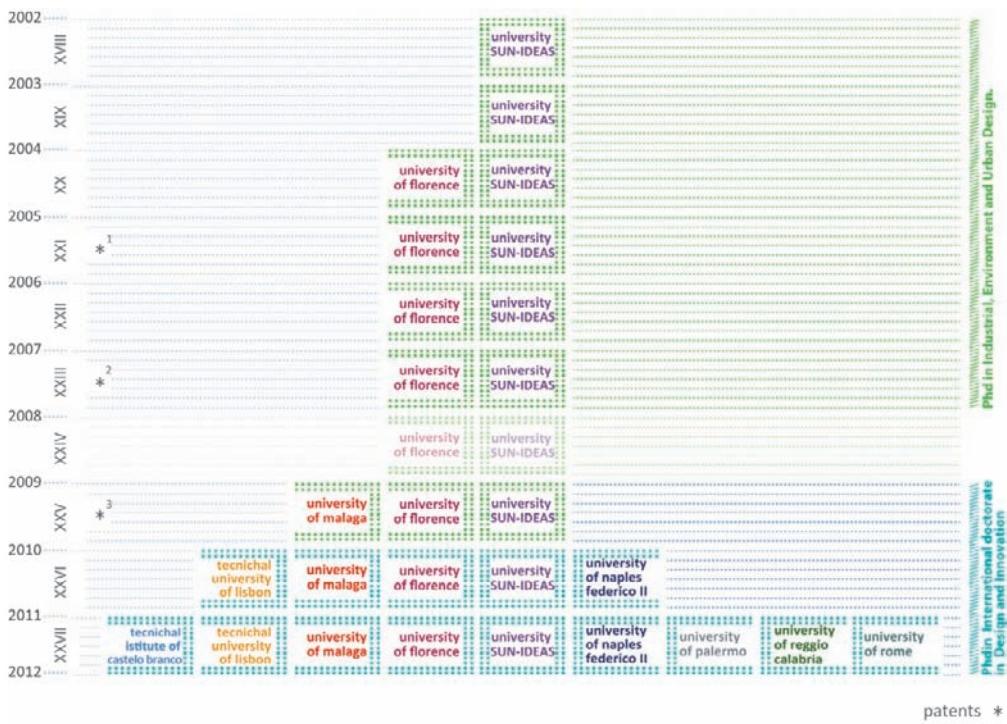
FIG. 1. PH.D. HISTORY.

To respond effectively to the needs expressed by the Erasmus Mundus Call, the first step was a benchmarking on master and doctoral degrees in the area of the design in Europe. The benchmarking has been implemented and extended worldwide.

Research in the design field is expanding enormously in European Countries, thanks to the presence of a solid cultural background in disciplines correlated with creativity and the manufacturing tradition. In Europe, and particularly in Northen Europe countries, there are numerous graduate programmes in industrial design (master's and doctorate degrees) that focus on specific aspects such as design for environmental sustainability, visual

communication design, automotive design and so on, imparting specific competencies for defined areas, as can be noted from the benchmarking that follows:

top universities phd in design	phd programs											specifications													
	industrial & product design	innovation	design	design history & theory	fashion design & textiles	user-centered design	energy & environment	communication & interaction	design strategy & service design	design science	mobility design	international phd programs	collaborations with universities	multidiscipline studies	innovative products&solutions	patents & spin-offs	business partnerships	practice based	theory based	research centers	academic services	int. exchange programs	web site available in english	career and stage support	advanced in technology

europe
- aalto university-school of art&design — www.taik.fi/mo — helsinki
- delft university of technology — io.home.tudeft.nl/en/ — delft
- eindhoven university of technology — w3.id.tue.nl/en/ — eindhoven
- istanbul technical university — www.tasarim.itu.edu.tr — istanbul
- middle east technical university — www.id.metu.edu.tr — ankara
- umea university - institute of design — www.dh.umu.se — umea
- the denish design school — dk.dkad.dk — copenhagen
- university of oslo — www.aho.no/en/ — oslo
- university of arts london — www.arts.ac.uk — london
- ensci les ateliers — www.ensci.com — paris

asia
- chiba university — www.eng.chiba-u.ac.jp — chiba
- the hong kong polytechnic university — www.sd.polyu.edu.hk — hong kong
- indian institute of technology bombay — www.idc.iitb.ac.in/ — bombay
- king mongkut's ins of tech ladkrabang — www.kmitl.ac.th/en — bangkok

america
- massachussets institute of technology — web.mit.edu — massachussets
- university of alberta — www.artdesign.ualberta.ca — alberta
- university of buenos aires — www.uba.ar/ingles — buenos aires

oceania
- university of sydney — sydney.edu.au/architecture — sydney
- university of wellington — www.victoria.ac.nz — wellington
- university of auckland — www.arts.auckland.ac.nz — auckland

phdin — International doctorate in DESIGN AND INNOVATION — www.designeinnovazione.com

FIG. 2. BENCHMARKING.

In relation to the analysis that has been conducted, the model of International Doctorate strives to respond effectively to the weakness that have been noted. It aims to do this through an innovative and flexible educational approach and, from a scientific standpoint, by addressing all aspects of this discipline, from product design to management, communication, graphic, and the definition and different fields of application of design and and various scientific fields.

For the specific objectives of the Erasmus Mundus programme the project provides for the expansion of the consortium that follows:
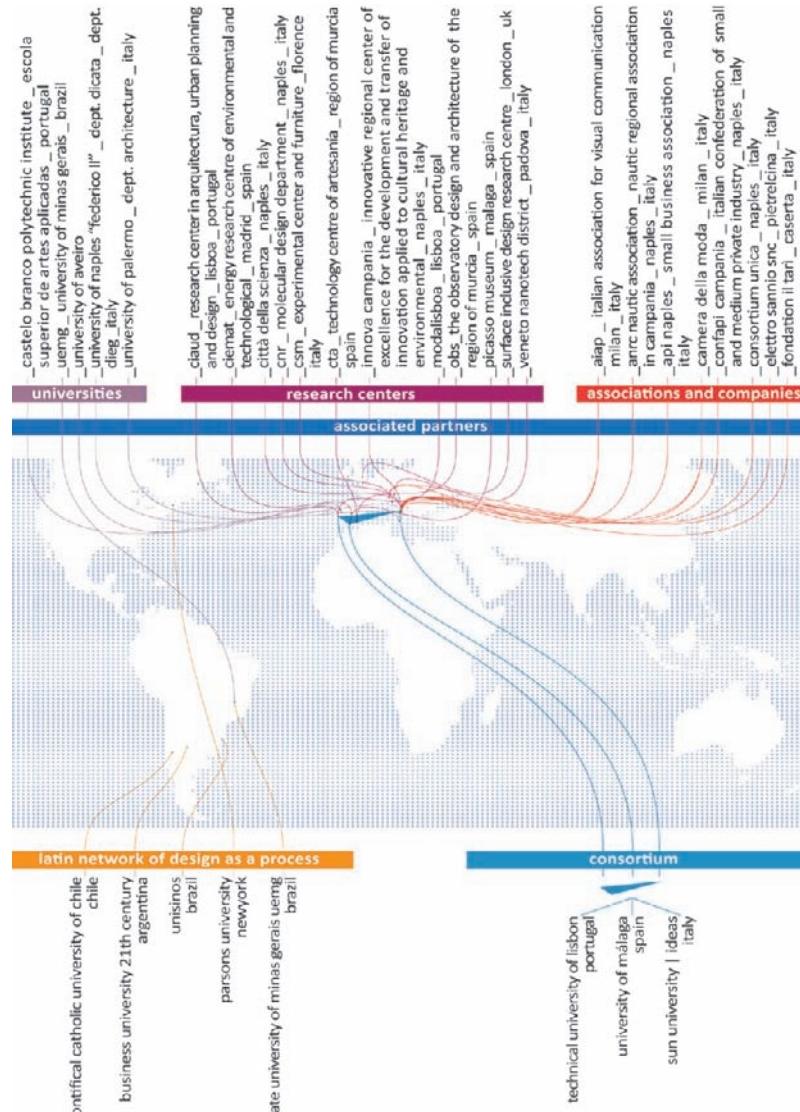
FIG. 3.
PH.D. CONSORTIUM.

The new consortium is characterised by the presence of academic partners specializing in various design areas. The following diagram summarises the areas of specialization covered by the universities and by corporate partners and research institute that have expressed an interest in participating to the project.

FIG. 4. AREAS OF SPECIALIZATION.

	aesthetics	brand design	critique	energy	ergonomics	exhibition design	fashion product design	graphic design	history of architecture	history of art	history of design	ict	inclusive design	management	marketing	material e textile	processing	product design	semiotics	sociology & new trends	strategic design	sustainability	tecnology
university																							
sun university | ideas	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
technical university of lisbon	•	•	•		•	•	•	•	•	•	•	•	•	•				•	•	•	•	•	•
university of málaga	•	•	•	•		•		•	•	•			•	•				•	•	•			•
escola superior de artes aplicadas _ ipcb	•	•	•			•	•	•	•									•	•	•	•		
uemg _ university of minas gerais	•	•	•		•	•	•	•	•	•	•			•				•	•	•	•		
federico II _ dept. dicata _ dept. dieg				•									•	•	•	•	•	•			•	•	•
university of palermo _ dept. architectura				•		•												•			•		
university of aveiro	•	•	•		•	•		•	•	•	•		•										
research center																							
ciaud							•	•					•				•						
ciemat			•																				•
città della scienza												•			•	•		•					•
cnr _ molecular design department															•		•						•
csm				•													•						
cta _ technology centre of artesanía																	•						
innova campania			•									•		•	•	•						•	•
modalisboa						•							•	•	•	•							•
obs	•						•	•	•	•						•	•			•		•	•
picasso museum			•						•	•									•				
surface inclusive design research centre				•								•					•					•	
veneto nanotech district			•									•										•	•
association / companies																							
aiap		•											•						•	•	•		
anrc nautic association												•	•	•	•					•	•	
api naples											•		•		•					•	•	
camera della moda				•	•							•	•	•								
confapi campania						•						•	•	•	•					•	•	
consortium unica				•							•	•	•	•					•	•	
elettro sannio snc				•							•	•		•	•					•	•	
fondation il tarì											•	•	•	•							•

As can clearly be noted, various fields are covered, ranging from art history to the design history, criticism, social and economic sciences, fashion design, graphics, communication and product design. Furthermore, the presence of expert on materials and of experts and researcher in the energy sector will orient specific cross-cutting studies in sectors that are strategic for Europe. This results, in regard to the scientific aspect, the singularity of the proposed model, compared courses analysed.

The program is structured in the form of training modules and design activities. The aim of the training modules is to give phd students a common set of skills and knowledge in order to help them grasp the system-product and get to the heart of design activities. Design activities constitute the bearing structure of the program and are conducted throughout the two years that follow the initial training year, ending with an internship at one of the partner business/research centres that is a member of the Consortium. The training modules for the first-year activities are constituted by face-to-face lectures on the various areas of design, criticism and history of design, communication, management, technology, social sciences, design for the energy industry and design for the fashion industry, product design, architecture, art history, sociology, material science, engineering, environmental, physic, innovation, marketing.

The proposed training program is developed through a dynamic and multidisciplinary approach, thanks to the competencies that come into play in innovation processes, defining an original and innovative pathway with respect to traditional ones, and viewing the simultaneous action of research and training as a valid instruments for this approach. The model of doctorate is distinguished by its experimental nature, with the convergence of research and teaching in order to guarantee – through hands on experience – the training of people with a highly developed professional background who are able to work critically in different production scenarios for research organization and in academic settings, in the area of product design, design for fashion oriented production system, innovative processes and communication. From a scientific standpoint, the educational contents are set up so as to provide basic know-how and the instruments needed for research and design activities. The training modules that constitute the background of the design and research activities refer to four main topic areas. The four main topic areas as follows:

THEMATIC AREAS

PRODUCT DESIGN, INNOVATION
AND NEW PRODUCT SYSTEM
innovation
product design
knowledge

PRODUCT DESIGN
AND INNOVATION
WITHIN FASHION ORIENTED SYSTEM
fashion image

DESIGN IDEAS AND VISIONS
aesthetic
critic

COMMUNICATION
IMAGE
CONSUMPTION PATTERNS
NEW LIFESTYLE
sociology

FIG. 5. THEMATIC AREAS.

PRODUCT DESIGN, INNOVATIONA AND NEW PRODUCT SYSTEM

The aim is to train students to identify new scenarios and areas of intervention for manu-facturing contexts, by using industrial design tools and creative processes and identifying strategies, innovative planning solutions and new products. They will also be given the ability to interpret, decipher and analyse possible restrictions and opportunities, and use their specific knowledge and skills to identify and utilise new materials and technological applications to plan the entire process by which an industrial product is developed: from the identification and analysis of potential problems through to the project itself and the final prototyping/industrialisation stage, with a guarantee of continuity and quality along the entire pathway.

DESIGN IDEAS AND VISIONS

The aim is to acquire a methodology for the interpretation and critical analysis of an in-dustrial product and its aesthetic/formal properties as an extra value that impacts on the emotional relationship with the end user. A further objective is to develop the ability to focus on the historical development of the industrial product, in particular by studying the way it has evolved since the 19th century until the present day, from an aesthetic, formal and functional point of view, and the way the product interacts with the end user and is incorporated into society.

PRODUCT DESIGN AND INNOVATION WITHIN FASHION-ORIENTED SYSTEMS

The aim is to train students to identify new scenarios and areas of intervention related to the design of fashion-oriented systems by defining innovative design solutions and produc-tion processes. By acquiring specific skills, students should be able to follow the entire process by which a fashion-oriented product is developed, with an advanced ability to critically analyse and interpret modern phenomena, identify and utilise new materials and technological applications in the fashion sector, elaborate innovative projects and follow the entire product development process through to the industrialisation and launch phase, by producing a communications plan.

COMMUNICATION, IMAGE, CONSUMPTION PATTERNS, NEW LIFESTYLES

The aim is to develop analytical and design skills in relation to brand design, communica-tions and media. The programme relates to the acquisition and exploration of theoretical and methodological issues related to communications and the exercise of skills intended to work in synergy with product and/or service designers as part of a process geared towards constructing and promoting the identity of a product, service or company. It will also explore issues and projects related to local development, including tourism, and will there-fore cover the advertising of cultural, environmental and natural heritage. Specific tools will be deployed in each area of research, to bypass the consolidated logic of the market and

communicate with other players from diverse backgrounds with the aim of rationalising and proposing innovative solutions and experimenting with new combinations of research and development.

The four main topic areas cover all design-related fields, starting with the history and criticism of the industrial object and going on to the design of innovative products, visual communication and design management. In the field of industrial production, a further distinction has been draw between product design and design for the fashion industry, diversifying the professional profiles offered. Following the first year of basic courses examining all four topics, or to investigate a subject common to two or more areas. The main topics also respond to the demand tied to university design training, with the presence of master's degree in product design, design and communication and specific university degree in fashion design.

The educational contents are organized so as to provide basic know-how and instruments needed for research and design activities. Special attention is paid to developing creativity and openness to change and to problems connected with managing design processes. Below is the timeline for the educational activities over the three year program. Since the phd students will already become part of ongoing research project of the end of the second year, they may also have the opportunity to cosign patent applications for industrial invention, PCT patents or international patents and may also help for academic spin-offs.

The lecture will be held in cycles, according to a timeline established. The first-year courses will be held by the professor at their respective universities through the interactive platform. This will allow the students to hear the lecture at any university campus. The educational plan for the first year has been designed to cover all fields common to the four profiles.
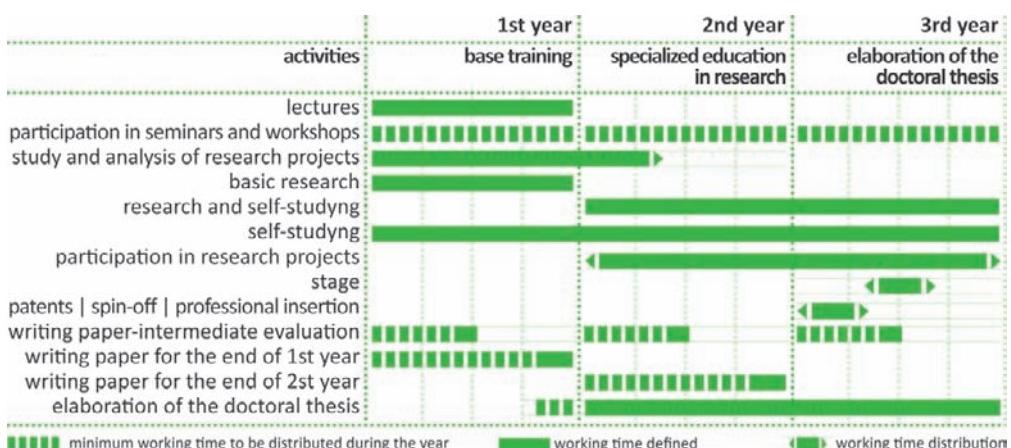
FIG. 6. ACTIVITIES TIMELINE.

The International Doctorate uses the virtual platform, throught wich students can exchange information, manage the programme of activities, follows the lectures and seminaries that form part of the course held at all the Consortium Universities and hold web meeting with all the members of the lecturing team, including those at other sites, carry out administration, upload articles, research project and slides to be discussed with external partners. Specifically this is an integrated platform for team collaboration and social software. It can be accessed by the researchers, teachers, international experts and representative from business and research institute.

The program provides that during the year of the phd program and with the faculty's approval, the young researcher must also complete an internship at one of the consortium partner. In reference to the set-up of the mobility plan, the aim of doctorate is to build "customized pathways" for each candidate, starting with aptitudes, interests and the researcher activities involved in this training. The diagram presents a model of mobility plan that includes an internship of the three months at a partner company. The internship is essential to enable any collaborations at the end of the phd program.
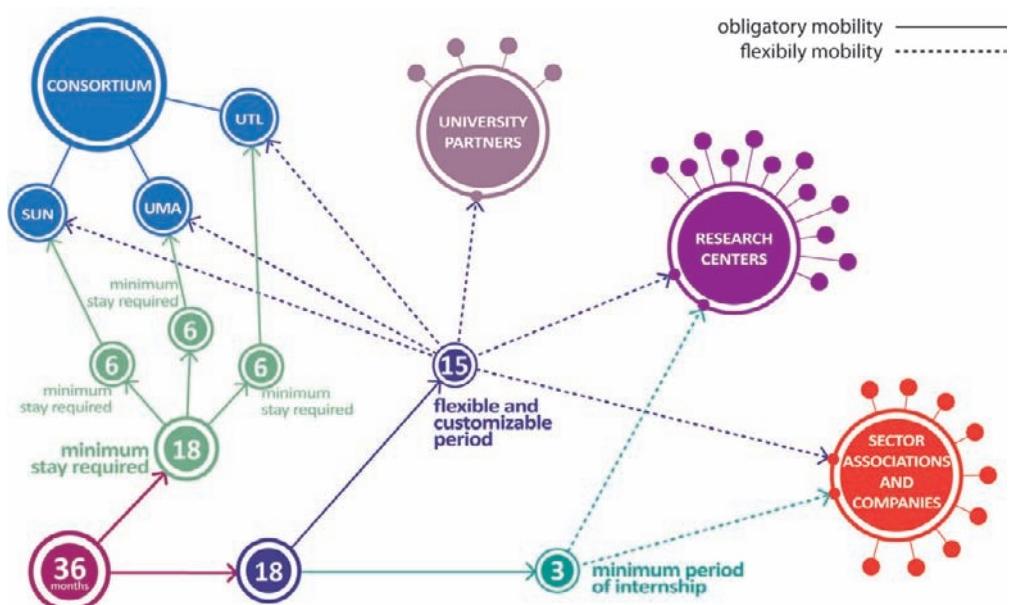
FIG. 7. MOBILITY PLAN.

The Faculty included professor from the universities that are part of the Consortium and a teaching staff with several professors from partner universities and researcher from partners research centre. The model provides that also use qualified experts in the scientific sectors and fields related to those of the programme. These experts may be from outside or from

universities other than those that are part of the Consortium, in order to conduct teaching activities and hold seminars, and to serve on the final Examination Board.
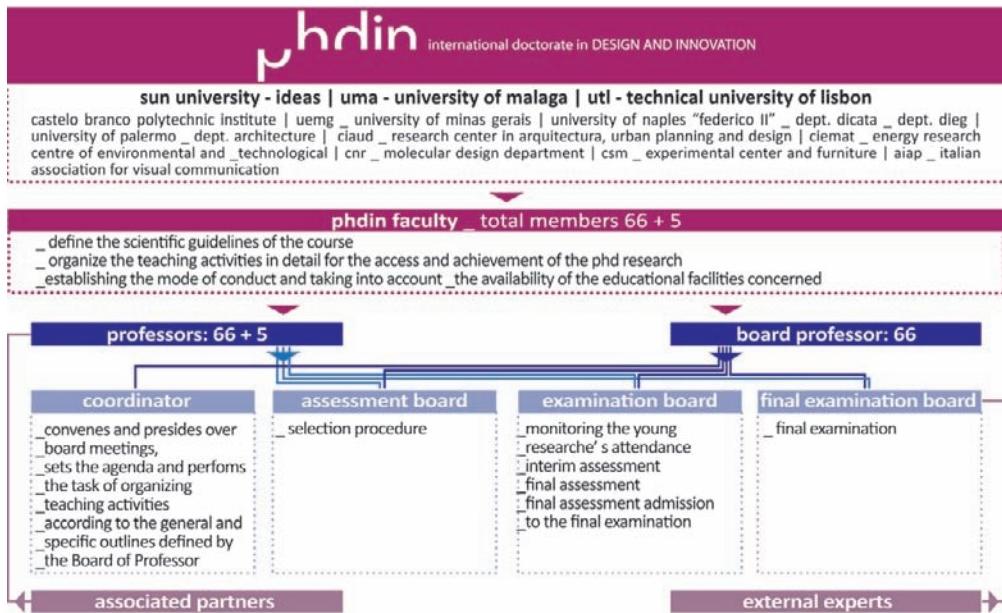
FIG. 8. Ph.D. FACULTY.

The concept of simultaneous research and training actions, here proposed, together with simultaneous development of a research project and the ongoing confrontation between different areas, would allow a reduction in time because the information is shared..

The model results in a friendly and creative environment, in which subsystems circulate, and that, from time to time, unite in a spontaneous order to achieve common goals. Information sharing, a continuous comparison and the use of processes to transfer knowledge and to generate and manage creativity, are the constants for the conduct of research in design and make these environments flexible to accommodate the new sub-systems and generate new knowledge. The establishment of this model, where agents and the processes of research and training blend, involves a detachment from strict academic rules in favor of innovative models, in line with modern ideas on the role of universities in the development of territory and the need for a renewal of the academic system. A renewal that, especially for research in design, because of the nature of this discipline, can not be separated from the production process and the constant comparison with territorial vocations.

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FROM TRANS-DISCIPLINARY TO "UNDISCIPLINED" DESIGN LEARNING: EDUCATING THROUGH/TO DISRUPTION[1]

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This document testifies the attempt at critically interpreting certain formative models of the designer from an evolutionary point of view. The criteria used to draw up a historical mapping and perform a reading of some interesting contemporary case histories concern the comparison between the subjective approach (the unveiling of the author's personality and different identity, considered as a subject under formation), on one hand, and the objective reproducibility of a process (project methodology), on the other.

We have offset this line of interpretation with the relationship between the concept of trans-disciplinary (an encoded approach of transferring methods and tools from other disciplines), and that of non-disciplinary or "undisciplined" (in the sense of transcending the disciplines and therefore looking for innovation "outside the rules").

This analysis comprises profiles resulted from specifically disciplinary educational traditions (artistic and polytechnic); however, a profile that is not formable within modern schools and which generates "out-of-context" designers also emerges. Lastly, a new profile is outlined that insists on learning rules and methodologies, but makes the disobedience of said rules and methods the margin of originality and distinction (which depends on the qualities of the designer and his/her subjective capacity and creativity).

The underlying assumption is that, through a shift towards the objective (therefore methodologically transmissible and encodable) and non-disciplinary dimensions, it is possible to educate highly "disruptive" profiles, inducing a certain attitude in students to tackling the design project through a method which can continually challenge its rules into

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[1] The paper is fruit of a coordinated work, however the author of paragraphs 1 and 4 is Flaviano Celaschi, the author of paragraph 2 is Elena Formia and the author of paragraphs 3 and 5 is Eleonora Lupo.

question, in order to innovate them.

The essay ends with a list of some contemporary challenges of education processes that seem to interpret surrounding conditions of profession and research in the sector and that, as a result, have still to determine changes in the official education models.

••• Subjectivity, objectivity, trans-disciplinary, undisciplined, disruptive designer •••

Within the theme of process innovation, a special chapter should be dedicated to the study of the change that involves educating human resources. Let's talk about the process closest related to design because it determines the characteristics we would like the designers we teach to have[2].

In this document, we are going to focus on the different techniques used to educate designers in an attempt to better understand which relationship exists, in the various models examined, between creativity, the method and the aim of educating designers with a strong capacity for innovation.

First and foremost we recognise the three traditional elements of cognitivist pedagogy as components of the educational process: knowing as the transmission of information and knowledge, know-how as training in acting independently, knowing-how to be as construction of the subject's personality.

The historical analysis then presents a parallel corridor of education: two educational traditions that have, over the years, created profiles of what we can call "designer", despite their substantially opposite approaches: schools focused on the fine arts and technical or polytechnical schools. These models are distinguished by the subjective or objective approach used. The former tradition has insisted greatly on the guided liberation of the characteristics of originality, diversity, uniqueness of the designer (creative-subjective approach to design). In the second, the focus has been put on learning a methodology and on the possibility to reiterate the process (scientific-objective approach to design).

Another area of analysis has led us to observe the inter and trans-disciplinary dimension of educational models, as present in the contemporary panorama, isolating some examples which shift the cross-fertilisation between skills towards a more fluid definition of the disciplinary statutes, up to a radicalisation that transcends the disciplines themselves, as an opportunity for educational innovation.

In the following paragraphs, we are going to develop these three points, presenting the knowledge basins of contemporary design and analysing the two axes of subjective-objective and interdisciplinary-non-disciplinary. The aim is to derive new possible and innovative trajectories for educating designers alongside existing educational models.

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[1] The centre of our current attention lies with design driven innovation processes in relation to this objective (the innovation of the processes that determine innovative products and services).

1. THE KNOWLEDGE BASINS OF CONTEMPORARY DESIGN

The debate that revolves around the know-how that forms the contemporary designer (Celaschi, 2008a; Celaschi, 2008b) is subject to different examinations: we adopt these studies as ground for our reflection and further development.

Breaking down into subcomponents the traditional and consolidated cognitivist categories (knowing, knowing-how to be, know-how,), we represent the elements that can be manipulated in order to develop different designer's profiles.
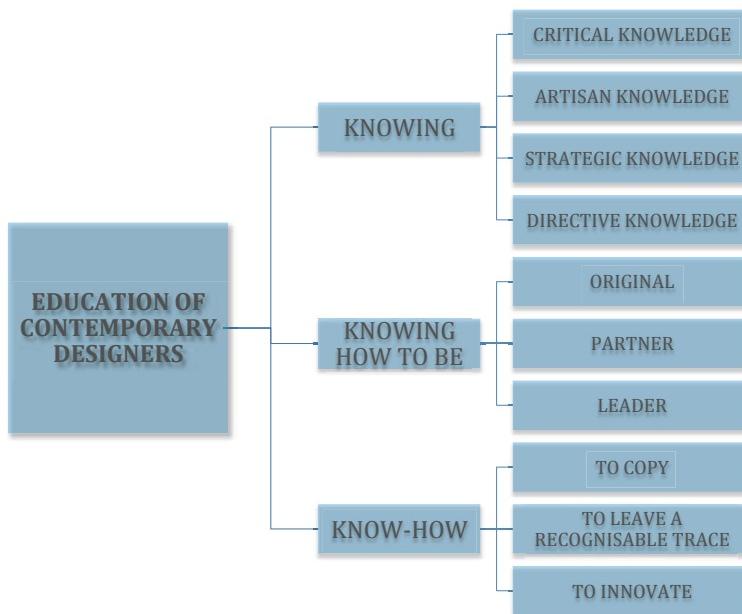
FIG. 1. THE ELEMENTS OF THE TRADITIONAL COGNITIVIST CATEGORIES THAT CAN BE MANIPULATED IN ORDER TO DEVELOP DIFFERENT DESIGNER PROFILES.

• In relation to knowing, the scheme positions and defines four different characteristics:
- the knowing how to criticise, typical of the intellectual designer and particularly of the critic, journalist or writer offering information on design;
- strategic knowledge which mainly identifies a managerial consultant-type figure, which is also developing in many Latin countries;
- the artisan knowledge typical of the designer who produces his/her own work and which is bordering more and more with the "maker" (Sennet, 2008), which doesn't necessarily

identify a professional manufacturer;
- the figure of a manager or entrepreneur who achieves success in his/her design-related profession on the basis of design thinking and placing design at the centre of his/her business, regardless of the fact that he/she is the designer of the product or the service provided and being more of the man behind the production chain (make or buy).
• As regards knowing-how to be, we are going to focus our attention on three problem categories:
- knowing how to be a leader (in synergy with the last of the knowing profiles outlined above);
- knowing how to be part of a design pair or of an operational micro-team, in which each member is an irreplaceable but insufficient part of the process;
- lastly, a creative subject par excellence who sees in the "free" expression of his/her own original personality the main contribution to the creation of professional value.
• In the know-how category, which is formed via the design action exercised in and out of school (in competitive or course-related activities), three main aims take up space:
- the ability to repeat the action of a subject taken as reference (like the master of the renaissance workshop) within an organisation which has, as its main activity, the reiteration of the design-related gesture of the demiurge;
- the ability to place oneself in the transformative action of the matter, leave a real trace in the product or in the service and know how to make the operator's imprint recognisable to the addressee;
- knowing how to innovate processes and products even at the cost of forgoing the recognisability of the author, his/her style or the possibility to be the only designer admitted to the value production process.

The analysis of the current educational panorama has led us to restrict the field observed with respect to the two traditional approaches: the method opposed to the development of the designer's personality. The roots of this dualism lie in the origins of the history of education to contemporary design, in which design occupied the middle of an "ideal" convergence of knowledge, following a process of study and assimilation of interpretative models, theoretical and methodological apparatus, and research tools.

2. INTERDISCIPLINARITY IN DESIGN TEACHING: A HISTORICAL AND CLASSICAL APPROACH

A basic dualism exists in the history of industrial design schools and their pedagogical approaches. These are, on one hand, the permanence of the artistic tradition of teaching at the Academies of Fine Arts (Écoles des Beaux Artes) and the Arts and Crafts Schools and, on the other, the progressive need to link design to scientific knowledge, based on objectivity and rationality, which emerged in particular following the Second World War (Cross, 2001; Bertola, 2009; Margolin, 2010). The latter approach gave rise to a need for it to be effectively

recognised within the context of higher education.

This dualism is common to the pioneering institutions that embody the paradigmatic changes in design education during the past century: the Bauhaus, which was still focused on an "artistic" dimension of education (Stasny, 1996), and the Hochschule für Gestaltung of Ulm, which opened in the early 1950s in the trail of the Bauhaus, but was soon oriented towards a "scientise" of the curriculum. To explain the transition from Bauhaus (particularly the period under the direction of Walter Gropius) to the HfG Ulm, Tomás Maldonado writes: "Mutamento c'è stato, e importante, ma in un campo specifico: quello attinente alla dottrina educativa e al suo corrispondente espletamento didattico e organizzativo. Cambia sostanzialmente il piano di studi, che riflette l'importanza attribuita, nel nuovo concetto, alle discipline scientifiche e tecniche. Cambia l'impostazione didattica del corso fondamentale che cerca di ridurre al minimo la presenza di quegli elementi di attivismo, intuizionismo e formalismo ereditati dalla didattica propedeutica del Bauhaus. Cambia, infine, il programma della sezione di disegno industriale, che orienta allo studio e all'approfondimento della metodologia della progettazione" (Maldonado, 2008)[3]. Alain Findeli (2001) also gives an interpretation of this evolution in the model of the "archetypal structure of a design curriculum". According to the author, the ideal threefold articulation of art, science and technology as founding elements for the design curriculum, was never put into practice in the above mentioned schools. The weight of the scientific dimension was minimum in the Bauhaus, while, in the HfG, the same occurred for the aesthetical one.

Apart from these institutions that radically innovated the design discipline through a "disruptive" approach (Bonsiepe, 1995), the evolution of industrial design education in the 1950s and 1960s seems to follow, especially in Europe, a bipolar nature through the presence of two main traditions.

Despite its short life, the Design Institute at Ulm had a considerable influence on global teaching methods (Bürdek, 2008), especially in South America (Fernández & Bonsiepe, 2008) where the first design schools were opened earlier than in Europe (Leon, 2011). This let to the foundation of new centres for professional training that were strictly oriented towards a scientific approach to design, while, on the other hand, the so-called "art schools" progressively included design courses in their programs. This happened in the Academies of Art and in the professional schools, where there were technical training courses, starting from the tradition of arts and crafts (Germany, Switzerland, England, Italy and Holland). They were later to undergo a university "transformation" process in England in the 1960s

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[3] "There has been a change, and extensive too, but in a specific field: that relating to educational doctrine and its corresponding didactic and organisational pursuit. Substantially, what changes is the study plan, which reflects the importance assigned, in the new concept, to the scientific and technical disciplines. The didactic approach of the fundamental course changes and an effort is made to drastically reduce the presence of those elements of activism, intuitionalism and formalism inherited from the propaedeutic course of the Bauhaus. Lastly, the programme of the industrial design section changes, focusing on the study and analysis of the design methodology." (Translated by the author of the paragraph).

(Saikaly, 2005) and in Germany in the 1980s (Heiner, 2008). Indeed, this substantial division comprises different models of institutions that have historically taught proto-designers and designers: from the traditional Academies of Fine Arts to the French-style fashion and design schools, the applied arts laboratories, particularly widespread throughout Northern Europe, the Art and Design schools developed in the US and the Schools of Engineering and Architecture.

The Italian situation represents a paradigmatic example of the dualism in the education of "artistic" or "technical" designers[4].

Awareness of the designer's professional autonomy, which also means the interest in education opportunities, developed later, only after the middle of the mid-1900s (Argan, 2001). The country's pedagogical heritage consisted, on one hand, of the tradition of the Polytechnics (established in 1861 in Turin as Scuola di Applicazione per Ingegneri and in 1863 in Milan as Istituto Tecnico Superiore), and, on the other, of the institutes of art, the applied art schools and the schools of artistic disciplines for industry (Gregotti, 1986). Finally a third variable was introduced, the entry of design didactics in the Schools of Architecture (sometimes incorporated in the Polytechnics, but more often independent).

The culture of architects took on the task of highlighting, from the design viewpoint, the values of an industrial culture, which, until then, had been given little consideration. The first university design course was launched at the Faculty of Architecture in Florence, in 1955, by Leonardo Ricci (Nardi, 1990). In 1958, a similar project occurred in Naples under the guide of Roberto Mango (Guida, 2006); in Turin, the first professor was Achille Castiglioni in 1969 (Peruccio, 2010). The "hierarchical model of design disciplines" (Ancheschi & Botta, 2009) that witnessed the supremacy of architecture over other disciplines (Dorfles, 2007), previously theorised by Gropius in Weimar, subsequently underwent a progressive emancipation, until the effective recognition of an independent industrial design degree course at the Politecnico di Milano in 1994.

However, the old alternative between the art and science of designing (paraphrasing the title of a famous book by Pier Luigi Nervi)[5], which had historically influenced the debate on the birth of the first Schools of Architecture in Italy in the 1920s[6], was still reflected in the polarity

[4] Technique in Greek is art, skill in certain crafts, the capacity to achieve a certain goal, the craftsman's ability to use certain tools. The Latin equivalent is ars. In the world of modern art, it is artistic experience in its aesthetic value. The word technique does not include the genius of the artist, but only his cognitive experience. In this, the concept of the technician is linked with the disciplinary heritage of a trade, of a group of specialised technicians. Consequently, it is necessary to legitimate it through a formative course.

[5] Nervi, P. L. (1945). Arte o scienza del costruire. Roma: Edizioni della Bussola.

[6] The problem of the formative curriculum of the architect before the creation of the Higher Schools of Architecture can be traced back to the didactic orders of the Polytechnics (particularly the Scuola di Applicazione per Ingegneri of Turin and the Istituto Tecnico Superiore of Milan) and of the Academies of Fine Arts. In the Academies, art was taught as liberal art (the only exception being the Roman Academy of San Luca which had included scientific subjects in its study programmes since 1818). In the Polytechnics, the diploma qualified its holder as an architect-technician, who had a very similar training to the civil engineer.

of the places devoted to educating designers that appeared from the 1960s onwards. Despite the entry of industrial design in the Schools of Architecture and in the Polytechnics and the progressive move towards scientific methodologies of designing, the first courses were called "Artistic design for industry".

On the other hand, the Schools of Art also followed a process of institutionalization. The Istituti Superiori di Industrie Artistiche (ISIA), the heirs of the applied art culture of the 1920s, were officially recognised in 1974. The first was opened in Rome and was followed by another in Florence. During the same period, design entered the Academies of Fine Art[7], such as the Accademia Ligustica of Genoa (1978-1979) or the Nuova Accademia di Belle Arti (Naba) of Milan, founded by Ausonio Zappa, Guido Ballo and Tito Varisco (1980). At the same time, further debate began on the educational opportunities of the professional designer, leading to the foundation of post-diploma schools (Gallico 2007). An avant-garde case was the Centro Studi Arte-Industria opened in 1954 by Nino Di Salvatore, who trained in the artistic environment of the MAC (Movimento di Arte Concreta)[8], later transformed into the Scuola Politecnica di Design, established in Milano in 1970. In the same years, the link between private schools, the art world, the Italian student protests and the post-modern militancy, became evident. To quote only a few examples, the Domus Academy (1982) involved Maria Grazia Mazzocchi, Alessandro Mendini, Valerio Castelli and Alessandro Guerriero; the latter, a leading exponent of the Alchimia group, established Futurarium, a "didactic workshop based on the merging of disciplines", in 1995. Remaining in the private schools, the country's educational culture had shown that it was particularly advanced in a specific sector, that of fashion. The Marangoni Institute in Milan was established in 1935 to train professionals in pattern-design and tailoring.

3. FROM TRANS-DISCIPLINARITY TO UNDISCIPLINED DESIGN TEACHING:
EXISTING APPROACHES

The concepts of interdisciplinarity before presented is based on the fact that "higher education has organised itself vertically, and on disciplinary sub-divisions" (Foqué, 2010): all the disciplines in the historical models come together but often keep working in parallel or side by side each other.

In the contemporary system we assist to more integrated model even promoting a shift towards trans-disciplinarity.

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[7] In 1960-1961 an industrial design course of university level was opened at the Istituto d'Arte of Venice. Two years later a similar process happened at the institutes of Florence and Rome. However, this was a not finalized action because of the un-recognition of the courses by the Italian Ministry.

[8] Di Salvatore founded the Centro Studi Arte-Industria in Novara in 1954, which was an interesting case-study to demonstrate the growing interested of Italian culture in design education after the Second World War. This center followed the example of the Bauhaus and Di Salvatore was a great exponent of the diffusion of the Gestalt theories in the country. Di Salvatore, N. (1958). *Rapporti arte-industria*. Novara: Centro Studi Arte-Industria.

According to Jean Piaget (1972) in fact there are three levels of integration among disciplines:
- multidisciplinarity, where information from another discipline is used to solve a problem in one's own discipline (information is momentary and occasionally borrowed only in one direction, with no feedback to the lending discipline);
- interdisciplinarity, where there is collaboration and interaction of knowledge, with enrichment of the disciplines themselves;
- trans-disciplinarity, where several disciplines are not only interacting but are reintegrated in a whole where the traditional boundaries disappear.

"La transdisciplinarità è la capacità di traghettare da una disciplina all'altra frammenti di sapere, anche a costo di sperimentare una logica antidisciplinare. Dunque non si tratta solo di mettere in contatto due o più discipline, che si pensano come autonome e compatte, ma del reale spostamento di metodi e soggetti da un ambito all'altro. Al prefisso inter- che indica la transizione tra una disciplina e l'altra, sarebbe quindi opportuno sostituire trans- che richiama il carattere performativo di queste transizioni, poichè insiste non su una logica degli interstizi, ma proprio sul carattere pratico (cioè alla prassi) di questi spostamenti che vengono realizzati dai soggetti" (Cometa, 2010).

It is precisely this third concept that we want to focus on in approaches that are already existing even if not yet fully codified or acknowledged.

The "blurring of design boundaries" in fact has been analysed in the last years by different scholars and practitioners. In 2008, a symposium at Napier University in Edinburgh, called *Inter_multi_trans_actions* explored the emerging trends in creativity with a "post-disciplinary" approach: practitioners from the fields of art, architecture and design shared their creative practices. The results have been collected in a book titled *Digital blur*, in which its editor, professor Paul Rodgers writes: "Design now, perhaps necessarily, transcends many more disciplines. Design is being described as multidisciplinary, cross-disciplinary, interdisciplinary and trans-disciplinary (Brown et al., 2010; Turnbull Hocking, 2010) and designers no longer fit into orderly categories such as product, textile and graphic design: rather they are a mixture of artists, engineers, designers, entrepreneurs and anthropologists (West, 2007)" (Rodgers, n.d.).

The same questions of cross-disciplinary blur have been discussed too under the initiatives promoted by FastUK: in the exhibition called *Perimeters, boundaries and borders*, John Marshall, artist director and curator, stigmatizes the breakdown of boundaries between disciplines through the common toolset (often characterized by digital technology) that architects, artists, craft-makers, designers, engineers, and others are now using and make them a "community of interests" in investigating the processes involved in the conception, production and also the consumption of the objects, looking beyond standard means of production.

According to Tony Dunne, professor of Interaction Design at the Royal College of Art, today it is increasingly common to find new hybrids of designers working on creative projects. He states: "New hybrids of design are emerging. People don't fit in neat categories; they're

a mixture of artists, engineers, designers, thinkers. They're in that fuzzy space and might be finding it quite tough, but the results are really exciting." (West, 2007).

However this not completely new: already in 2006 Richard Seymour proposed that the world needs a different breed of designer in this modern, dynamic and highly competitive environment – the "hybrid" designer: the "polymath interpolator" uses his or her experience and "broad bandwidth" to define the area where the solution might lie and the "specialist executor" then implements it specifically within the format that is needed (Rodgers, 2007).

In relation to this blurring, Rodgers, in his *Designing the next generation of designers* sets some implications for design education: "excellence should be established for multi-disciplinary courses combining management studies, engineering and technology and the creative arts", and "the role of design as a bridge between technology and art, ideas and ends, culture and commerce is vital. Because design can be a major player in shaping a world where a value-enhanced user-perspective is developing, cross-functional, creative alliances must be formed" (Rodgers, 2007). More in detail he states (Rodgers, 2007):

- Design students should not attempt to develop deep expertise in any one field, but, rather, take in information from many sources. Far from being a weakness this represents real generalist strength;

- Designing is no longer a localised activity. Every individual designer and design practice competes and has access to every level of practice and expertise;

- Designers must be comfortable working with others, and being skilled in managing the dynamics of group activity;

- Designing is increasingly about intellectual capital and less about delivering a trade or craft ability.

John Marshall and Julian Bleecker argued that those experiences go beyond disciplinary practices and talk about undisciplinarity: "'Undisciplinarity' is as much a way of doing work as it is a departure from ways of doing work. It is a work habit and approach to creating and circulating culture that can go its own way, without worrying about working outside of what histories-of-disciplines say is 'proper' work. It's 'undisciplined' […] and it means new knowledge is created rather than incremental contributions to a body of existing knowledge"[9].

It is an epistemological shift from disciplinarity, to interdisciplinarity, via trans-disciplinarity, to undisciplinarity; forgetting about disciplines altogether being a more radical step than merely "transcending" the disciplines.

Undisciplinarity does not means that design is not a discipline, nor that it has no thematic focuses; it instead refers more to being "undisciplined", in the sense of questioning the "rigour in emerging design disciplines" as pointed out in the Design Research Society of 2008: a discussion has been arisen about the emerging kinds of design that were challenging the

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[9] http://nearfuturelaboratory.com/tag/undisciplinarity.

framework of specialisms and, therefore, reshaping the design field. In this frame, the forms of inquiry, the methods and the rules proper of design needed to be compared with the ones of other areas, to come to a "shared understanding of rigour" as is differently declined. According to Alan Blackwell, founder of Crucible Network for Research in Interdisciplinary Design, and reader of interdisciplinary design at the University of Cambridge, the practices and values of design have different attributes from the ones that constitute the academic rigour of other disciplines, "that address well-formulated problems, […] that there are agreed methods for addressing the problem, and agreed criteria for what constitutes an answer" ('*on being undisciplined*', Blackwell, 2008). Steve Harfield too claims that "rather than being a knowledge-generating discipline, the field of design generally constitutes a practice-based knowledge-utilization discipline", and "that the above factors not only actively contribute to, but promote and prolong design's undisciplinarity" (Harfield, 2008).

So, given these existing approaches, we propose to cross the dimension of disciplinarity here explored in its opposites (trans-disciplinarity vs undisciplinarity) with the dimension of subjectivity-objectivity previously analysed in the historical approaches. From this comparison we will derive a four quadrants model where to argument the discourse of innovation of educational models for design.

4. A FOUR QUADRANT MODEL:
CROSSING CLASSICAL APPROACHES WITH CONTEMPORARY TRENDS

In the diagram of Fig. 2 we have shown, on a horizontal axis, the difference between art school and technical school, separated according to a subjective (and therefore individual) and objective (and therefore encodable and methodologically transferrable as a process) approach. We then interpreted these two approaches, interweaving them with the disciplinary issue, developed on the vertical axis, through the two extremes of consolidated disciplinary centrality (trans-disciplinary) and admitted or even encouraged transgression (non-disciplinary).

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                    TRANS-DISCIPLINARITY


            Self-taught designer        Designer as mediator


SUBJECTIVE                                                 OBJECTIVE


            Situationist designer        Disruptive designer


                      UNDISCIPLINED
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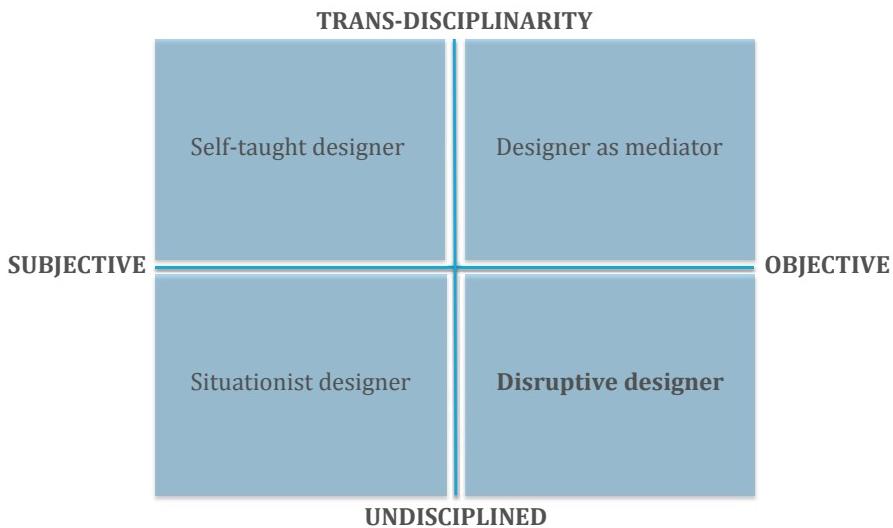
FIG. 2. FOUR TARGET PROFILES OF DESIGNERS.

Within the summary that we have represented with a four-quadrant map, we have identified four target profiles. Four profiles of contemporary designer have emerged: the first two are educated using more or less traditional long-term academic processes (designer mediator, considered as an advanced point with respect to the polytechnical education courses; and "situationist" designers, considered as the outcome of the "bosartist" module evolved from the new traditions of the American-style schools of performing arts–acting or TV-oriented schools (like that portrayed in "Fame"). The other two are more interesting in terms of our studies: the non-educational figure of the intellectual designer and that of the designer that we define "disruptive" as achieved from subjects who are being educated or have already been educated according to different traditions, via shorter immersive courses.

1. The self-taught designer: that outlined in quadrant A (trans-disciplinary but subjective and individual approach). This is often a designer who has not been to design school. A person who, in most cases, has built up his own cultural profile and who, thanks to this absence of imprinting, is able to develop a "liberal" profession, outside the conventional profiles that operate inside or for a company. This profile is embodied by historical designers like Enzo Mari or contemporary designers like Giulio Iacchetti. Designers who can not be educated without standardising or ruining the authenticity of the figure.

What interests us about this figure, here, is the value of witness within traditional education processes (be they artistic or technical). Usually, when called upon to talk to the pupils of a school, this figure adopts a disruptive kind of behaviour, tending to mock every kind

of scholastic teaching offered, attacking students, trying to prove the presumed "sleepiness" that an excessively secularised process has generated in their minds, and develops a role of breakage that is evident in claims like: "*I never studied but….", "to be a designer all you need is to be curious and to open your eyes and ears to the world...", "forget about these projects are get out and see what the real world is made of, get your hands dirty…*". A fundamental task of this profile in education processes is to develop a displacement, determined by the breakage of the certainty that the completion of studies or the acquisition of educational qualifications is sufficient to generate a successful designer.

2. The "situationist" designer: the profile outlined in quadrant B (subjective and "undisciplined" approach) belongs to designers who have made the construction of their identity and of the relative narration the fulcrum of their design process. Heirs to Situationism, they apply their design technique to themselves, in order to build up a character like a product. These designers often create situationist happenings that use the designer's body and attitudes as ways of establishing themselves as brands. Examples of this profile are proto-designers such as Fortunato Depero and contemporary designers like Fabio Novembre. Within an educational process, these subjects usually show a considerable affinity with the school they attended and do not deny their teachers, tending, on the other hand, to celebrate them: "I was able to see so far ahead because I was seated on the shoulders of giants" (Novembre, 2010).

3. The designer mediator: the profile defined in quadrant C (trans-discipline as a method) is a designer who is not so easy to describe, because he/she escapes personalisms and authority on the product. His/her aim is to build or consolidate the team and the mediated integration between different types of knowledge and different specialisms. He/she is a discoverer of talents, someone who enhances chains of skills, and a builder of organisations. His/her education is one of the most important educational challenges that innovative and trans-disciplinary schools are pursuing in the name of the integration of the traditional profiles existing (Aalto University, MIT, Politecnico di Milano). This designer uses design tools not only to design objects and services but also to define strategies, study situations and analyse opportunities. At the same time, he/she tries to see the aesthetic and functional dimension of things everywhere, inside an organisation and in the construction of the documentation created to accompany a design. Knowledge related to economics and management converge within him/her, along with the humanistic knowledge of social sciences.

4. The disruptive designer: the profile of quadrant D (non-disciplinary design as a method) is, by definition, an experimenter who uses the logic of science and art together, integrating them and blending them, a professional of innovative processes that often start from the ability to disavow methods, bypass restrictions, constantly seeking radical innovation and avoiding becoming attached to a single method. This is not the fruit of a systematic course of education planned at the table, but could be proposed to profiles who are studying in traditional schools, attending particularly intense parallel or successive medium or short-term courses (i.e. summer schools, residential workshops, specialist masters). The discovery of

disruption and the consequent decision to transgress as a rule takes place incidentally, being flanked by a particularly innovative teacher with whom a close relationship is developed, or via an intense journey, a formative event or an experience that opens up a door left ajar in the mind through which the discomfort of dissatisfaction with the everyday way of working had already begun to filter.

These four profiles coexist in contemporary organisations and contemporary organisations have a parallel or a consequential need for each of these ways of a being a designer.

5. A PROPOSAL: DISRUPTION AS UNDISCIPLINED ATTITUDE IN EDUCATION

We intend to focus now on the fourth model, the disruptive designer, as one of the more interesting challenge for the innovation of the educational models of design.

First of all is important to clarify what it is intended for "disruption" in this context. The concept of disruption is still disputed within the design community: it comes from business ("open innovation", Chesbrough, 2003) and technology literature (from Christensen, 1997 to Williams, 2010) where is defined as "an innovation that creates a new market by applying a different set of values, which ultimately (and unexpectedly) overtakes an existing market" (Williams, 2010). Applying this concept to education implies promoting radical changes and discontinuity in the training of young designers. The paradigm of "disruption" becomes, at the same time, content and objective of the didactic of design: how to manage a "disruptive" educational process? How to obtain a "disruptive" result (namely a disruptive designer)? We hypothesize that an undisciplined approach trains a designer to be more disruptive and innovative, even if for their features a disruptive designer often is a result of a not traditional training and an undisciplined approach cannot literally be taught trough a discipline. Still there is a question: if we can lead students, stimulating an undisciplined attitude, to become disruptive, can an undisciplined attitude be induced in the students? Can it be codified (therefore made transmissible) in the design education processes? Or do we need to disrupt the teaching process itself? Is not a paradox to codify an undisciplined approach? To overcome these contradictions what we propose is to educate the designer towards an attitude in questioning rules, methods, procedures and boundaries and in deliberately controvert to explore them. In this frame we intend "disruption" as this capacity of innovation acting outside the rules. Our hypothesis is based on a set of possible "triggering actions" of the educational process, under the statement of "rules disobeying or discharging". We consider the opportunity of disobeying rules that are relevant of the quality of the design objects and processes:

⁃ technical-functional rules;
⁃ socio-economical rules;
⁃ aesthetical rules.

The following are some exemplifications that are already practiced in the phenomenology of contemporary didactic: through these cases and examples we intend underline all the signs,

still not systematic yet promising, that read as a whole can lead to confirm our hypothesis, even if they cannot yet be considered a systematic model. The idea is to apply consistently the only rule of "putting in question the rules of designing, while doing and teaching design" (Lupo, 2010).

Disobeying technical-functional rules

In this area we have i.e., relatively to the dimension of the object, the transgression of the ergonomic rules (design out of scale, change of proportion...), of the use of material (iper-materialization vs annulations of matter, sinesthesia…) or of the function (transforming, deleting or substituting components, working against gravity...). At the dimension of the process, i.e., we can fragment the process (an historical example is Cadavre exquis, a collective creative drawing technique used by Man Ray, Joan Miró, Max Morise and Yves Tanguy, where everybody makes his own piece attached to the others but seeing only the final portion of the previous work), or invert the linearity of the process itself (i.e starting from the end).

FIG. 3. DISOBEYING TECHNICAL-FUNCTIONAL RULES: FROM LEFT MATERIALS (GHOST ARMCHAIR BY CINI BOERI AND TOMU KATAYANAGI, PRODUCED BY FIAM ITALIA, 1987 AND FALKLAND LAMP BY BRUNO MUNARI, PRODUCED BY DANESE, 1964), GRAVITY (SKY PLANTER DESIGNED BY PATRICK MORRIS, PRODUCED BY BOSKKE, 2008), LINEARITY OF THE PROCESS ("*CADAVRE EXQUIS*" BY MAN RAY, JOAN MIRÓ, MAX MORISE AND YVES TANGUY).

Disobeying socio-economical rules

In this area we can have i.e., relatively to the product dimension, the transgression of the unicity of the work and of the contextualization (let's think Enzo Mari "autoprogettazione"- design by yourself - manual, and, in the contemporaneity, to the design of some components i.e. those handlers or taps that try to overcome bonds of a structured context-system). At the process scale we have the transgression of the authoriality of the work: the concepts of post-production, mixage,... etc. derived from arts and the 2.0 web, are the new metaphors for co-design, co-creation starting from existing objects and components.
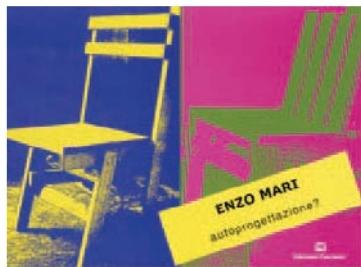
FIG. 4. DISOBEYING SOCIO-ECONOMIC RULES: CONTEXT (ENZO MARI IS AUTHOR OF THE BOOK *AUTOPROGETTAZIONE?* PUBLISHED BY CORRAINI, MANTOVA, IN 2002).

Disobeying aesthetical rules

In this area, relative to the scale of object only, we can have, i.e., the transgression of common semantic values and used metaphors, of the temporal dimension, the transgression of perfection (giving to the unfinished, imperfect and incomplete the right of object).

FIG. 5. DISOBEYING AESTHETICAL RULES: SEMANTIC VALUES (MEZZADRO BY ACHILLE AND PIER GIACOMO CASTIGLIONI, DESIGNED IN 1957 AND PRODUCED BY ZANOTTA IN 1971), PERFECTION (COFFEE AND CIGARETTE BY JULIE KRAKOWSKI, AUTOPRODUCTION, 2006).

	technical-functional rules	socio-economical rules	aesthetical rules
Process dimension	Fragmenting the process Inverting the linearity of the process	transgression of the authoriality of the work	-
Object dimension	transgression of : - the ergonomic rules - the use of material - the function	transgression of: - the uniqueness of the work - the contextualization	transgression of: - common semantic values - perfection - time

TAB. 1. POSSIBLE RULES DISOBEYING TO BE APPLIED IN THE DESIGN LEARNING PROCESS

CONCLUSIONS: NEW CHALLENGES OF FORMATIVE EXPERIMENTATION

Questioning the design rules in order to innovate them has been presented in this paper as an approach to disrupt the educational design process getting out innovation from an undisciplined attitude. We assumed this approach from actual trends in the re-interpretation of the value of trans-disciplinarity towards a radical shift transcending the disciplines themselves.

This approach anyway is just one of the multifaceted conditions of contemporary design, in which various conditions put in crisis the education process.

So, beside the search for disruption trough undisciplinarity, we can isolate al least other three phenomena that are challenging the innovation of training processes: for them we try to anticipate some indication and insights.

- The socialisation of design thinking, methods and skills: if everything is designable and everybody can be a designer (see for instance the project "Office+Retrofit" www.officeretrofit. com), how can be design passed trough formal and institutional education? Who owns the authoritativeness, the proper "design knowledge" (culture, tools of design) to teach design? In this case it could be more appropriate to use the concept of "school" (intended not as institution but as a group of people characterised by a common way of thinking and method of work) to reshape the education system in a more informal way.

- The spectacular quality of the designer: if the designer is more than being at the centre of the project with his subjectivity and personality, because he is literally the project and is communicated as a product, how can the designer "mediator" learn to became a direct protagonist (in fact he is part of a backstage process)? The educational process should be shaped for the creation of open networks and communication systems, on which rely for the public and social reliability of the star system designer.

- Collective co-design intelligence: if the agency is a community, a group of people and of interests, where co-creation and participation lead to a flexibility of procedures, what can be codified and taught about this? The educational model should point out on skills enabling decision making processes and negotiation dynamics.

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TEACHING DESIGN PROCESS TO NON-DESIGNERS

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An organized, cyclical design process is utilized by many design professionals as an effective creative problem-solving tool for addressing complex problems. That design process may be the most significant transferable skill set the design field has to offer to those outside the profession.

The challenge is to teach the design process to non-designers as a set of tools for creative problem solving in any scenario, not just for design applications. This paper outlines how this subject is addressed for non-designers in an Introduction to Product Design course, detailing some of the tools and resources assembled for the course.

••• Design process, non-designers, product design •••

A. THE MYTH OF THE LONE GENIUS

In design culture, the mythology of the 'lone genius' creative archetype is perpetuated by the proliferation of 'rock-star' designers in mass media. Non-designers, in particular, seem to believe that independent geniuses materialize design solutions out of thin air and build the future from those epiphanies. However, as noted by Peter Skillman in the famous Nightline video about IDEO, "Enlightened trial and error succeeds over the planning of the lone genius." (Deep Dive 1999) The challenge is to teach design process, a methodology for pursuing 'enlightened trial and error', to non-designers as a set of tools for creative problem solving in any scenario. This may be the most significant transferable skillset the design field has to offer to those outside the profession.

UNCERTAINTY / PATTERNS / INSIGHTS   CLARITY / FOCUS

RESEARCH   CONCEPT / PROTOTYPE   DESIGN
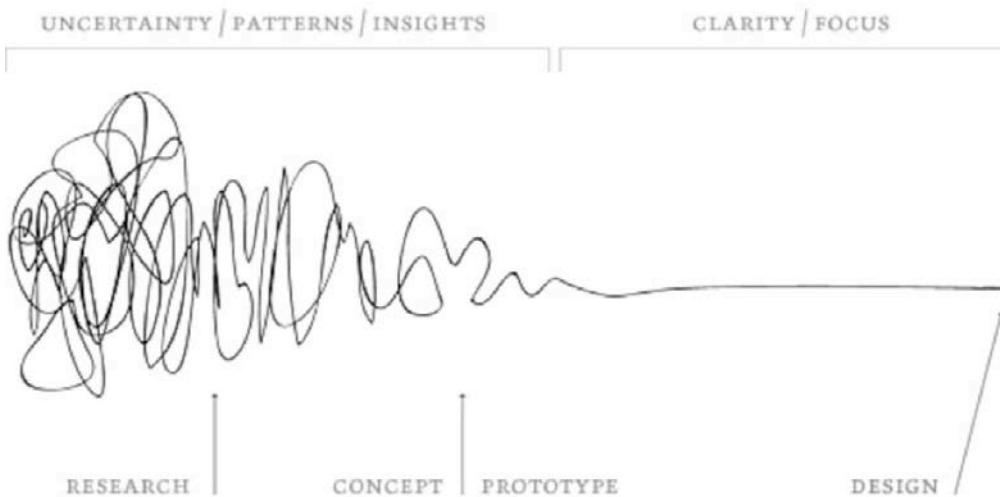
FIG. 1. THE DESIGN PROCESS ILLUSTRATED IN A SINGLE LINE (NEWMAN).

B. DESIGN PROCESS AS A SET OF TRANSFERRABLE SKILLS

Designers are experts at developing cohesive solutions to complex problems. How they do this is often embedded in a creative problem solving methodology referred to as *design process*. According to Dave Kelley of IDEO, "The point is that we're not actually experts in any given area; we're kind of experts on the process of how you design stuff. So we don't care if you give us a toothbrush… a space shuttle… whatever. It's all the same to us. We want to figure out how to innovate by using our process and applying it." (Deep Dive 1999)

Design process is an iterative method of developing and refining creative solutions to a presented problem, alternating between right-brained/divergent concept generation, and left-brained/convergent concept analysis and critique. The process tends to begin with many loose concepts and narrow to fewer developed concepts, before choosing and refining a final concept direction.

"Although this approach may vary depending on the firm… the ID [industrial design] process can be thought of as consisting of the following phases:

Phase 1: Investigation of customer needs

Phase 2: Conceptualization

Phase 3: Preliminary refinement

Phase 4: Further refinement and final concept selection

Phase 5: Control drawings

Phase 6: Coordination with engineering, manufacturing, & vendors" (Ulrich 2011, p.196)

A similar approach is used by graphic designers, fashion designers, architects, and others. It is a common method for negotiating the multiple, and often competing, constraints/

expectations of a complex problem with varied stakeholders. The design process is used to navigate through many creative solutions quickly, trying out and synthesizing a wide array of ideas before getting very detailed or committed to any one concept.

The key transferrable skill is the iterative process, pursuing a conscious strategy to address a problem through multiple cycles of incremental development. While designers tend to be experts in such a process and have highly refined skills at each step along the way, the structure of a design process itself is highly transferable to other creative problem solving applications and doesn't require design expertise at each stage.

This paper is intended to introduce how design process is taught as part of an Introduction to Product Design course for both design majors and non-design students. In teaching design process, it is helpful to address *why* it works as much as *how* to apply it, particularly when teaching students who may have limited exposure to creative problem-solving techniques. Additionally, if one understands why specific aspects of design process are effective, then they can more flexibly apply it to their own problem-solving needs later.

In Learning and Memory, John R. Anderson states, "Learning is the process by which relatively permanent changes occur in behavior potential as a result of experience." (quoted in Burnett, 2010) If this is true, then the goal of teaching design process is to create changes in 'behavior potential' as a result of an in-class experience that students can apply later. The specific changes sought are: for students to see themselves as capable of creative problem solving, that they have tools to enhance this ability, they have an understanding of how to apply those tools in a structured way, and see the benefit of an iterative incremental development of ideas.

B.1. Creativity

While design process is an approach to creative problem solving, it is more than another name for creativity. Csikszenthmihalyi provides an excellent analysis of creativity in his book *Creativity: Flow and the Psychology of Discovery and Invention*. In it, he outlines the Five Stages of the Creative Process:

1. Preparation
2. Incubation
3. Insight
4. Evaluation
5. Elaboration (Csikszenthmihalyi, 1997, 79)

This outline of creativity provides a useful starting point for an analysis of *design process*. Most importantly, it illustrates that there are multiple phases and that creativity is more than the moment of 'Insight'. In the context of design process, Csikszenthmihalyi's outline for creativity establishes an outline of one cycle of an iterative *design process*.

B.2. From broad to narrow

In the search for innovative design, there is a need to dig for new solutions, to reach further out for unique and never-seen-before solutions. 'Avoid the low hanging fruit' is a phrase

I often heard from a former design manager. 'Low hanging fruit' refers to those easy solutions – often the first things to come to mind when presented with a problem. "... [C]reative ideas tend to be remote. That is, original ideas usually only come to you once the obvious ones are depleted." (Christensen and Schunn, 2009, 50)

It is therefore necessary to start broad in order to thoroughly push the creative boundaries and to explore the field of possibilities. The question might be asked, then, of how does one generate many ideas from which to choose? This is the area of divergent thinking: "Divergent thinking isn't the same thing as creativity. I define creativity as the process of having original ideas that have value... Divergent thinking is an essential capacity for creativity. It's the ability to see lots of possible answers to a question, lots of possible ways of interpreting a question, to think... laterally." (Robinson, 2010)
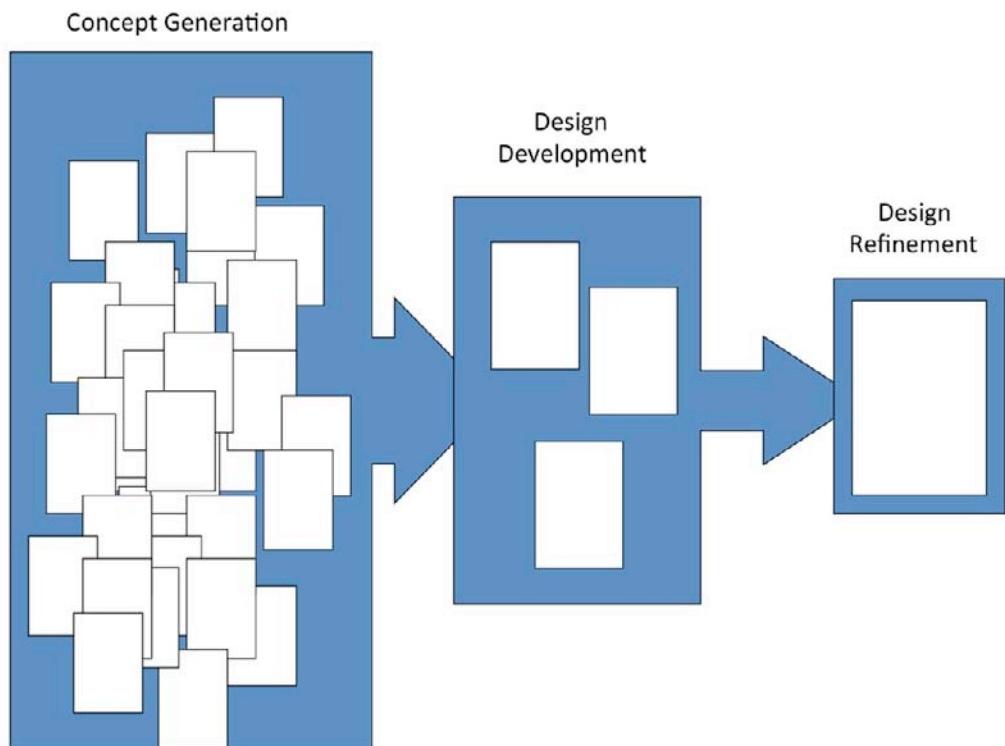
FIG. 2. THE DESIGN PROCESS SIMPLIFIED.

Divergent thinking is a right-brained skill. Below, a number of tools will be introduced to enhance this skill. First, however, it will be helpful to discuss the difference between right- and left-brained thinking processes as mutually beneficial modes within the design process.

B.3. Alternating Between Left- and Right-Brained Thinking

A key aspect of design process is the alternation between right-brained/divergent concept

generation, and left-brained/convergent concept analysis and critique. These are two very different modes of thought, and to be successful at *design process* it is important to learn how to separate them, focusing on one or the other at different times. This is essentially a learned 'split-brain' operation. Design process provides a useful structure for making use of these two modes of thought in an alternating pattern, giving them each their respective space by applying them separately.

LEFT BRAIN
dealing with one thing at a tir
processing information in a
    linear fashion

operating sequentially
writing
analyzing
idea-linking
abstracting
categorizing
logic
reasoning
judgment
mathematical
verbal memory
using symbols

RIGHT BRAIN
integrating many inputs at once
holistic perception or thinking
seat of dreams
awareness without definition
seeing whole solutions at once
seeing similarities
intuition
insight
gut feeling
synthesizing
visualizing
visual memory
recognizing patterns
relating things to the present

FIG. 3. ATTRIBUTES OF LEFT VS. RIGHT-BRAIN THINKING (MICHALKO 2006), IMAGES ADDED SEPARATELY.

A critical part of the design process that has been left out of Ulrich's design process (out-lined above), is the *design review*: between each phase of design development, there must necessarily be a period of design evaluation and selection, a more left-brained decision-making phase to control which ideas go forward and which are left behind. This filter becomes increasingly narrow as the process progresses, allowing fewer ideas at each suc-cessive stage of development. Fig.4 shows how the alternation of L/R thinking aligns with the design process, including these design review phases.

Design Phase	Description	Left or Right-brain thinking
1	Investigation of customer needs	Left
2a	Conceptualization	Right
2b	Design Review & Selection	Left
3a	Preliminary refinement	Right
3b	Design Review & Selection	Left
4a	Further refinement	Right & Left
4b	Design Review and final approval	Left
5	Control drawings	Left
6	Coordination with engineering, mfg., & vendors	Left

FIG. 4. DESIGN PROCESS WITH LEFT/RIGHT CATEGORIES.

In order to elaborate on the left/right alternation, this paper will focus on two stages of the design process: 2a) Conceptualization and 2b) Design Review and Selection. If one understands the application of appropriate tools in these alternating phases, as well as the structure of design process, then Phase 2 provides a model structure for future iterations in design process. Phases 3 and 4 are then seen as more focused iterations of Phase 2.

B.3.a. Right-brained divergent thinking

We tend to think of designers as having an innate skill with creativity or right-brained thinking. However, there are many tools and strategies that can be learned to enhance this ability.

Right-brain tools used in this Introduction to Product Design class:

· Mind-mapping
· Group Brainstorming
· Creativity Cards

Mind mapping and Creativity Cards will be discussed later in this paper. Here, the focus will be on brainstorming as a tool for divergent thinking, engaging a group of varied individuals to create multiple new solutions to the problem at-hand. The guidelines below are intended to facilitate this process, and enhance divergent thinking.

Brainstorming Guidelines

These are guidelines presented to students to facilitate successful group brainstorming, based on Alex Osborn's rules for brainstorming developed in the 1950's. (Isaksen, 2008)

1. Defer all judgment
2. Go for Quantity
3. Far-out is good (see rule 1)
4. Piggyback ideas
5. Document all ideas

Rule 1: Defer all judgment

There are many existing strategies for creating an effective 'brainstorming session', and I

do not propose to have the 'right' way to do this. What is important in the context of this paper is that there is a period of focused creativity, nurtured and encouraged in an environment that is optimistic and playful, without judgment. Judgment is a part of critique, a more left-brained approach that is good for selecting successful ideas from unsuccessful ones – it has its benefits later in the process. If judgment is allowed at this stage of the design process, it tends to shift the group from right-brained creativity to left-brained analysis, derailing the divergent thinking effort of generating as many ideas as possible.

Wearing the hat of the creative can be fun. It may be unfamiliar to some, and the risk of sounding 'silly' or 'stupid' can be intimidating. This is the essential reason for keeping the 'judge' out of the discussion. In class (or on a design team), a group practices encouraging wild ideas (Rule 3), and building off of each-other's wild ideas (Rule 4). They are encouraged to share their ideas and open them up to reinterpretation (Rule 5). If ideas are critiqued at this stage of the process, then the flow of creativity is stymied by doubt and insecurity. It is amazing to watch how fast students get involved in this process, engaging in the playful mentality of concept generation. It is equally surprising to watch the tendencies of some that are quick to judgment and critique, and how fast they can shut down the creativity of a group.

Rule 2: Go for quantity

The need for quantity has already been discussed above (see From Broad to Narrow), regarding the process of exhausting obvious solutions in order to reach more unique ideas. Going for quantity is also a necessary strategy to avoid the pitfall of 'fixation' - the tendency to hyper-focus on one solution, or to become attached to a favorite concept early in the process (Tversky and Suwa, 2009, 81). The tendency of our left-brained mindset is to find a viable solution quickly and implement it - fix the problem and move on. From a purely practical point of view, it is a waste of time to look for more than one answer if there is already a solution.

Fixation is one of the greatest challenges when teaching design process, as students tend to come to a solution quickly and hold on to it, not having experienced or practiced the benefits of pursuing multiple solutions. To be told that their concept may not be the ultimate can be interpreted as a judgment that their idea is not good enough, and therefore shut down the search for more divergent ideas. Encouraging quantity over quality at an early stage of design process can avoid this. However, in a class, most students will provide exactly the number of concepts asked of them. Therefore, I have found it necessary to demand a high number of concepts in order to incentivize students pushing for more creative solutions.

Rule 3: Far-out is good

It is easier to make a far-out idea into a feasible solution than it is to make a conservative solution into a new and exciting concept. As Kelly explains, "If everybody only came up with sane things… you'd never have points to take off and create a really innovative idea."

(Deep Dive, 1999) Again, judgment must be deferred to encourage participants to take risks. With judgment deferred (Rule 1), and 'low-hanging fruit' exhausted (Rule 2), the territory of wild ideas becomes and open field to explore.

Rule 4: Piggyback ideas

In group brainstorming, there is a random inter-mingling of multiple thought-trains between individuals. This is just as important as the random subconscious intermingling of ideas/images in any one individual's mind. Steven Johnson uses the phrase, "where ideas have sex" – to discuss the cross-fertilization of ideas, where two or more solutions mingle and give birth to new and unexpected solutions. (Johnson, 2010b)

Tversky and Suwa discuss this phenomenon in terms of perceptual reorganization, the ability to look at the same information differently. "Because sketches are visible they can be inspected and re-inspected, considered and reconsidered. Designers can discover new properties and relations from their sketches as they inspect them – properties and relations that emerge from the sketch but were not intentionally put there." (Tversky and Suwa, 2009, 76) One's ability to perceptual reorganize the elements within a sketch, or to reorganize a group of concepts in order to draw new interconnections, is another source of idea generation that can be fostered (Tversky and Suwa, 2009, 80-81). This can happen with a group that is generating concepts together, or as an individual looking at one's own sketches. Once again, having a wide range of diverse solutions (Rule 2), and having some far-out concepts to spur new directions (Rule 3) can facilitate an even broader exploration as ideas are reinterpreted and recombined.

Rule 5: Document Everything

Even the 'low-hanging fruit' should be documented and included in the group of sketches to be considered in the process of perceptual reorganization. Three primary benefits of documenting all ideas in a brainstorming session are:

1) By documenting all ideas, they are recorded and the mental slate is cleared to make room for a new idea. If an idea is not drawn out and documented, it can tend to occupy the mind rather than making way for new ideas – this is the pitfall of fixation, discussed above.

2) An idea, even an simple or silly one, once documented for others to see, may be interpreted/misinterpreted later and lead to a new solution (Rule 4).

3) If one should pursue intellectual property rights for an idea, it helps to have documentation of the origination and development in order to show provenance and original thought.

The above 'guidelines' are just that, and there is great flexibility in how they can be applied. The point here is to show the interdependence of these guidelines and illustrate how brainstorming is not simply putting a group of people in a room with blank sheets of paper to fill, but is an organized creativity methodology structured to facilitate divergent thinking and a more focused use of the right side of one's brain.

B.3.b. Left-brain critical thinking

The open-ended generative thinking of brainstorming could go on forever, creating more

and more far-out concepts. However, the point of the design process is to efficiently get to one cohesive solution. "[Nigel] Cross says the designer's traditional approach to solving problems, especially if they are ill defined (as a great many necessarily are at the outset of a project), is to move fairly quickly to a potential solution. Even if the solution does not fit, it reveals further aspects of the problem and hence clarifies it for another attempt at a solution." (Dormer, 1993, 24)

Therefore, there is a necessary shifting of gears in design process and a return to the concepts wearing a different hat – that of the left-brain analytical critic. It is important that this happens at a different time, even more helpful if it is in a separate meeting so that the concepts can be approached with 'fresh' eyes. (Isaksen, 2008, 4)

Left-brain tools used in the Introduction to Product Design class:

· Post-it design critiques
· Concept pitch and critique/dialogue
· Decision matrices

When wearing the hat of the critic, the goal is to select the best ideas out of the documented concepts based on a set of established criteria. This stage requires stepping out of personal bias, with in-depth knowledge of the problem to be solved, and choosing the solutions with the most potential. This is a very different mentality than that used to encourage new and far-out ideas. Each documented concept is now subject to a more analytical, critical eye, evaluating on a more immediate yes/no response.

Culturally, we tend to be more practiced at such left-brain critique. Therefore, this paper will focus more on right-brained creativity strategies and the need for alternating between left- and right-brained thinking during design process. Below are some general guidelines for getting the most from a critique.

Guidelines for critique:

· Be constructive - if a solution seems unrealistic etc., offer suggestions for how it could be improved
· Focus on what works - be optimistic rather than pessimistic
· Evaluate against a set of known data - judge based on research, not personal bias.

B.4. Between Left & Right - Subconscious Processing

While the design process outlined above describes the conscious effort to structure a split-brain approach to creative problem solving, it doesn't acknowledge the value of subconscious thinking. Behind the veil of conscious thought, the bulk of neural activity in the human mind is continually recombining thoughts and perceptions, considering contingencies, scanning for familiar faces/objects, etc. Amidst this swarm of subconscious activity, our minds are free to break the rules of everyday reality, to make connections that wouldn't normally be allowed. (Csikszenthmihalyi, 1997)

We are all familiar with the 'aha' moment, or Csikszenthmihalyi's Phase 3 of Creativity: *Insight*. It is that instance where a solution suddenly becomes clear for a problem one had

been thinking about previously. Likely, the person didn't know that their subconscious was still working on the problem, and doing so with enough awareness to recognize a viable solution and present it to the conscious mind. That is the role of *incubation*, the phase of creativity preceding insight.

Steven Johnson reminds us that, "Insight favors the prepared mind." (Johnson 2010b) This helps to illuminate the parallels between Csikszenthmihalyi's Phases of Creativity and Ulrich's Phases of the Design Process. The first phase: Preparation, or Investigation of Customer Needs, might simply be called Research. This is a time to become intimately familiar with the problem, looking at it from different vantage points, and filling the mind with relevant information. I refer to this as '*charging the subconscious*'. Between conscious phases of the design process (e.g. at night while falling asleep, during a shower, driving to work, etc.) the subconscious is continuing to 'think' about the problem, developing new combinations of the information gathered.

In the strategic alternation between left and right-brained thinking, this 'incubation' might be considered a neutral state in-between, when the conscious mind lets go of the problem and turns it over to the more random recombinations of the subconscious. Following this period, it becomes easier to return to the problem with 'fresh eyes' and see it from a new perspective.

Understanding this, one can use incubation for greater divergent thinking. When asked to come up with 20 solutions to a given problem, students tend to balk. Those with more practice at divergent thinking can quickly generate 5-6; most will slow down at 3. When they understand the benefit of 'incubation', they know that it takes time to clear the conscious mind of known solutions (fixation) and generate more divergent ideas. If one sets a goal of coming up with 3-5 concepts at a time at intervals over a number of days, then incubation has time to develop new ideas and offer them to the conscious effort.
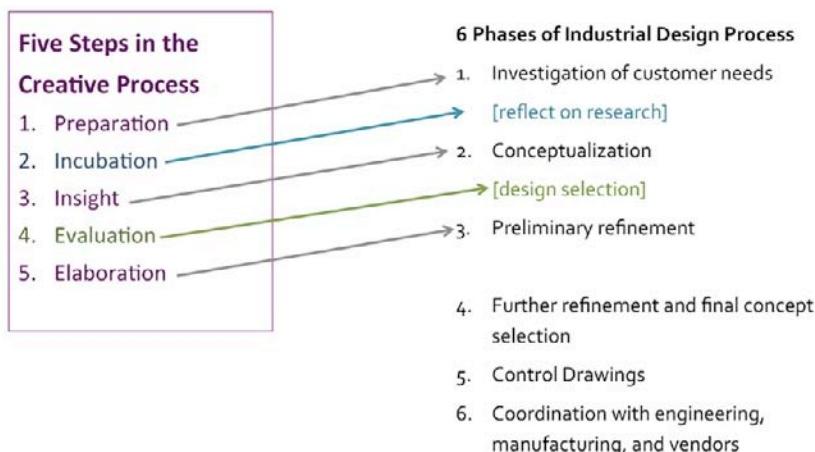
FIG. 5. PARALLELS BETWEEN CREATIVE PROCESS AND DESIGN PROCESS.

B.5. The cycle repeats

Given the limited space for this paper, similar detail cannot be provided for all stages of the design process. However, the overall pattern is similar: alternating between left- and right-brained thinking. The difference is that as the process goes forward, the number of ideas explored continues to decrease as the established criteria for a successful design become more solidified. The number of cycles in the process depends on the complexity of the problem. In *Product Design and Development*, Ulrich and Eppinger provide a good summary of the overall process, including appropriate deliverables for each phase. (Ulrich, 2011) Fig.6 shows the relationship of the number of concepts over time in the design process. One detail to note is the swell of concepts in each phase. For example, if 3 concepts are moving forward into Phase 3, then those concepts will likely multiply as variations are pursued and recombinations explored. At the end of this phase, however, design selection will choose a smaller number to go forward.
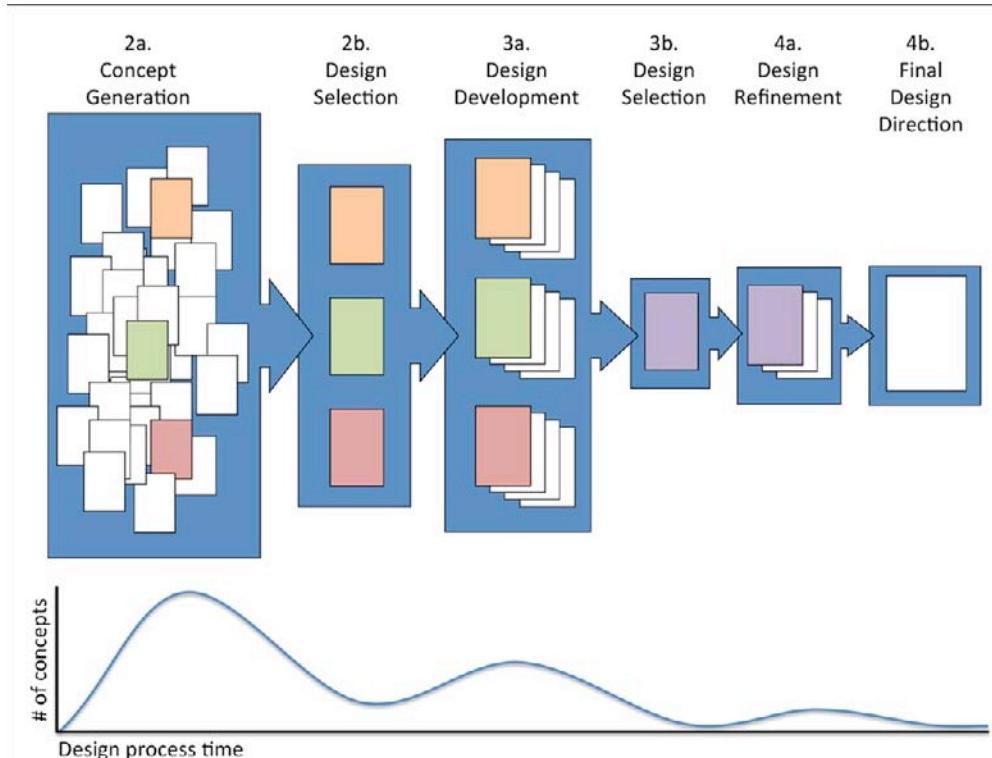
FIG. 6. THE VOLUME OF CONCEPTS EXPLORED AT STAGES OF THE DESIGN PROCESS.

B.6. Drawing is the language of design process

Drawing is a designer's primary tool for both concept generation (right-brain) and idea

communication (left-brain). The process of drawing ideas can itself be part of a concept exploration, in which the designer uses the drawing to have a kind of visual conversation with him/herself. (a.k.a. perceptual reorganization). Alternatively, drawing can be used more directly for left-brain analysis, or to illustrate an already conceived idea to a larger audience. In the design process outlined above, sketches are used during brainstorming to explore and develop ideas; later, they are used during a critique to explain those ideas to others. It may even be the same sketch, though the role of the sketch changes. (McKim, 1980, 12)

When teaching design process to non-designers, drawing confidence can be a significant issue. Students who have not had experience with drawing can be hesitant and self-critical. It is helpful to remind them that the goal is not to create an attractive piece of artwork, but to use drawing for visual communication. Their sketches can be low-quality – what is important is the quality of the idea, and the ability to communicate that idea to others. In fact, having a drawing misinterpreted is a welcome opportunity for perceptual reorganization, and to piggyback one idea onto another.

C. H-STRUCTURE: THE BENEFITS OF SPLIT-BRAIN THINKING

Design process is a learned split-brain behavior, which provides a means for incremental development of a solution through iterative cycles of right-brained creative thinking and left-brain analytical thinking. The whole of that structure, including left-brained and right-brained strategies in an organized framework, creates the H-structure of design process.
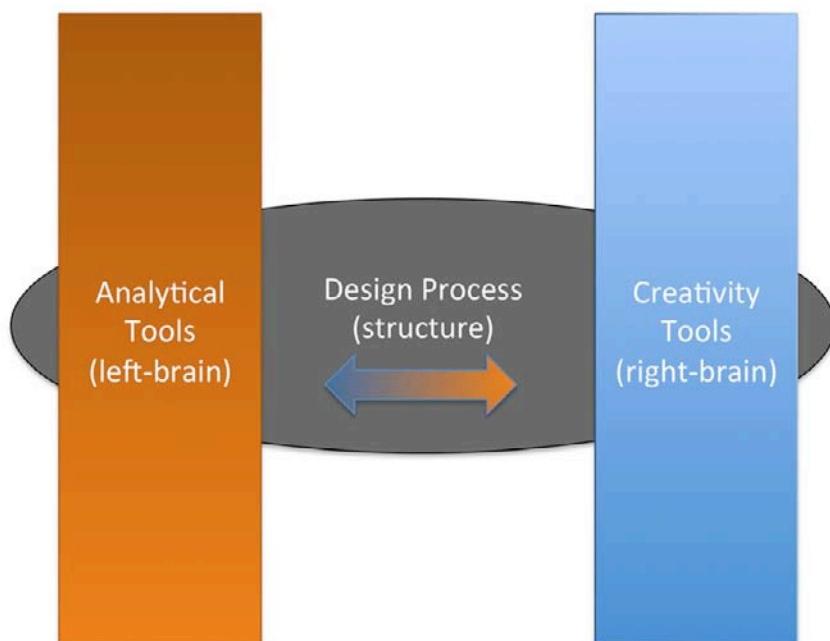
FIG. 7. H-STRUCTURE OF DESIGN PROCESS.

The H-Structure consists of two pillars (Left and Right-brained tools), linked by iterations in the design process. The space between left and right-brained activities provides moments for 'incubation', or subconscious processing (see B.4. above). The goal of teaching these materials in Introduction to Product Design is to create H-type thinkers: individuals with skills for implementing left or right-brain thinking as well as strategies for applying those skills towards building creative solutions via an iterative design process.

To understand this structure, it is important to first understand the need to separate idea generation (right-brain) from judgment (left-brain), discussed in B.3. above. For example, if judgment (left) is not deferred during brainstorming (right), the flow of creativity is stymied by doubt & insecurity. Vice-versa, in order to make meaningful judgments and limit the number of ideas being pursued, the left-brain critic has to occasionally be given priority to reign in right-brain divergence.

To apply this structure, it is essential to have appropriate tools for each of those phases. A number of tools for the left/right phases have been introduced in this paper, and there are many more available. Which tools are used is often a matter of personal preference. More importantly, the structure of an organized design process (e.g. FIG.4) facilitates the successful application of those tools. Just as there are many tools to choose from at each phase, there are many approaches to how the design process is structured. The specific structure is not critical, however, the following attributes are important:
· Cyclical iteration of Left- and Right-brained thinking
· Starting with many ideas and narrowing with each cycle
· Visual communication of ideas through sketches.

D. TWO GROUPS OF LEARNERS
D.1. Design Students
The students in an Introduction to Product Design course can be divided into two categories: designer majors and non-design majors. These two groups have separate needs. Design majors are generally coming from creative backgrounds, and expect themselves to come up with creative and aesthetic solutions to problems. The challenge for them is to push their divergent thinking skills and look past the pitfall of fixation. The design process and associated tools taught in this class help students to generate more diverse solutions and pursue multiple parallel paths, rather than becoming attached to a single concept.

Part of what is unique for designers is the more analytical breakdown of why and how design process is organized the way it is. These students may have been through a similar process before on a studio project. However, they likely have not had the psychology of the alternation between left and right-brained approaches detailed. Outlining the steps of the design process with clear definition and rationale helps to reinforce the application of that process in their own work.

D.2. Non-design students

Non-design majors, on the other hand, typically do not think of themselves as creative, and are hesitant to present new solutions, especially if they are aesthetically based. The challenge with these students is to demonstrate their innate creativity and to give them a set of skills to not only come up with diverse solutions to problems, but to systematically improve on those ideas.

The non-design students in this class are primarily Appropriate Technology or Building Science majors. These students tend to come from a more pragmatic background, skilled in analytical problem solving. Though they are accustomed to thinking about building and making things, it is usually from a very solution-based approach – e.g. how to construct a wind turbine for maximum electric power generation. Such problems are not typically asking for aesthetic or ergonomic solutions, but for technical and analytical ones. Also, these students are not usually asked to come up with multiple solutions to a problem, but one viable solution.

For these students, learning design process is not about preparing them for later design studio classes, or for a career in design. It is intended to increase their confidence in creative problem solving, divergent thinking, and visual communication.

D.3. Student Questionnaire

For this paper, students from the past two semesters of this course were given a questionnaire about their experience with design process in the class. Below are some of the student's comments:

Non-design students:

"After the class I have been much more likely to write down or draw any idea that first comes to mind when working on a project, even the ones that seem silly at first."

"Yes, my ideas certainly changed… Creativity for me became less strained, more structured. I didn't push myself to develop a good idea. I incubate now, and let ideas flow."

"Mind-mapping was a tool I was unfamiliar with before PD that helped me organize my conceptions without constricting creativity in an organized, flow-of-thought discipline."

"Yes, the small steps to develop my idea slowly helped me to stay focused on an idea with leeway to make minor tweaks along the way. It took the stress out of a big project and kept me organized… I have used the same method in other technical classes to maintain a schedule and narrow in on a vision I have for a piece of work."

Industrial Design Students:

"I liked the design process we used. It allowed for incubation time, as well as expansion. Since we did a lot of sketches in the beginning we could start stretching our mind. We may have had to come up with some ridiculous ideas to get enough sketches, but sometimes the ridiculous ideas lead to really good ideas that I would not have thought of if I did not have to do so many sketches."

"For me SCAMPER is the most effective tool. Even though it may not be the most

preferred method, I tend to do my creative process in my head, and SCAMPER is a simple way for me to come up with 'what if' type scenarios."

"I've been told countless times that creativity is a process but in this class we demonstrated the process and I was convinced that you can't think of the best idea first. You have to build up to it."

E. EDUCATIONAL RESOURCES

Below is a brief description of the readings, videos, and other resources used to teach creativity and design process in the Introduction to Product Design course.

E.1. Readings

1. Design Process (Ulrich, Ch.10, Product Design)

This reading comes from a textbook that is directed at engineers studying product design. This helps to objectively elaborate on what a designer does from an outside perspective, explaining how design process fits into the larger manufacturing process.

2. The Work of Creativity (Csikszentmihalyi, Ch.6, Creativity)

Csikszentmihalyi is an insightful author on the subject of psychology and creativity. Here, he outlines the five stages of the creative process: Preparation, Incubation, Insight, Evaluation, and Elaboration.

3. Prototyping (Kelly, Ch. 6, The Art of Innovation)

The essential message from this reading is that sometimes the best approach to solving a complex problem is to try out a solution and learn from the results. Any solution, when pushed forward as a model, will reveal new opportunities.

E.2. Videos

Pertinent videos help stress the current class subject from a different point of view. Moreover, I have found that these types of videos offer an authoritative weight to the topic being taught.

1. The Deep Dive / Nightline special about IDEO

The video adds a level of drama and dynamism to design process. It brings in multiple experts and puts the dialogue on a national/international scale. In this video, students see non-designers working on design projects. (Deep Dive)

2. Where Good Ideas Come From

Steven Johnson's TEDtalk about 'Where Good Ideas Come From' is an engaging synopsis of his book of the same title. This video reinforces concepts about the creative process discussed in 'The Work of Creativity'. (Johnson, 2010b)

3. Changing Paradigms

Sir Ken Robinson's lecture on Changing Paradigms is an engaging critique of the western education model. However, the RSAnimate version is even more dynamic and visually compelling. It helps demonstrate a couple of things that are key to the class: 1) It shows how abstract concepts can be simply communicated in a drawing, and 2) The critique reminds us that we are all capable of divergent thinking. (Robinson, 2010).

E.3. Additional Creativity Tools

There are many books and resources available for helping to become more creative. What I try to offer students are free, accessible, and relatively simple tools they can use to push their creativity further.

1. Mind Maps:

Mind mapping is the simple process of drawing connections between words or ideas. It is a fun and intuitive way to tap into subconscious association, and an effective tool for divergent thinking.

This exercise tends to be a bit of a surprise to students as they find out what unexpected associations they have with the words that come up. It is always a surprise to me that almost none of my students have used this simple tool before. I am sure that they have been taught how to do a linear outline for writing a paper, but no one has taught them how to do a lateral outline for exploring creative possibilities.
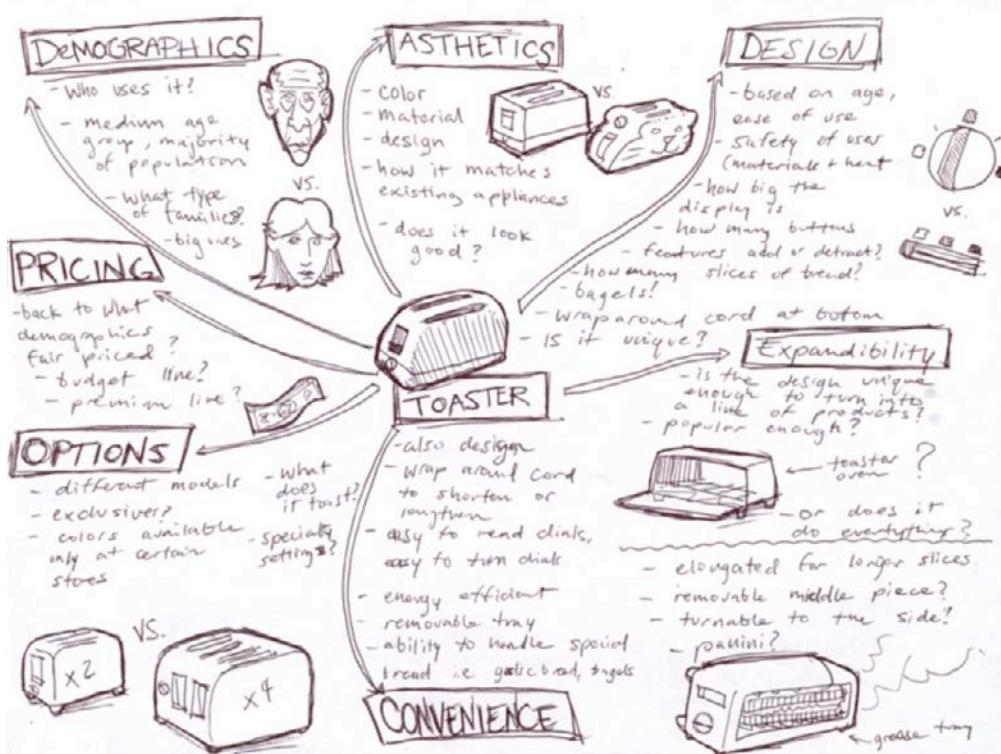
FIG. 8. EXAMPLE OF A STUDENT MIND MAP FROM THIS CLASS.

There is software available for making tidy digital mind-maps (or flow-charts). However, the process of data entry on a computer quickly separates one from the immediacy of right-

brain thinking. I encourage students to create their mind-maps on paper with a pen or pencil in order to stay focused and respond quickly and intuitively.

2. Creativity Cards

Another set of tools used in this class is purely intended to bump one's mind out of a familiar track and into unfamiliar territory. There are a number of creativity card sets marketed for this purpose, such as the Creativity Whack Pack or Thinkertoys. Harvey Cards are a free, open-source version available on-line. I prefer these cards for that reason alone.

The approach is to use the cards to develop random 'forced connections' (Christensen and Schunn, 2009, 49) between ideas in order to stimulate creative solutions. While thinking about a problem/solution, draw a card and incorporate the information on the card in the solution. Harvey Cards can be alien and disconcerting at first (What does it mean to "mythologize" a toaster?) However, the strange responses to these types of mental nudges can be just what are needed to push the breadth of solutions further.

Sympathize

Relate to your subject. Put yourself in its shoes. Think of it as having human qualities.

Animate

Bring life to inanimate subjects (having human qualities). Apply repetition, progression, narration.

Superimpose

Overlap, cover, overlay. Superimpose dissimilar images or ideas. Combine sensory perceptions (sound/color, etc.). Combine different point of view synchronistically.

Change Size

Make subject bigger or smaller. Change proportion relative size.

Substitute

Exchange, switch, replace. What other ideas, images, etc. can be substituted?

Isolate

Separate, set apart, crop, detach. Use only parts. What elements can you detach or focus on?

FIG. 9. SAMPLE HARVEY CARDS (HARVEY).

3. Scamper

This is an acronym that comes from Michael Michalko's companion book for Thinkertoys (Michalko 2006). SCAMPER stands for: Substitute, Combine, Adapt, Magnify, Put (to another use), Eliminate, Reverse. Students are asked to memorize SCAMPER and apply it to a given problem. This is one of the most handy creativity tools to have around – one that is stored in your own memory. It is free, portable, easy to remember, and offers a diverse range of directions from which to develop creative solutions.

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DESIGN FOR TERRITORIAL DEVELOPMENT IN EMERGING ECONOMIES: BRAZILIAN EXPERIENCES OF RESEARCH AND TEACHING

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Design contributions to territorial development have been increasingly gaining recognition. Various theoretical and applied studies, mostly conducted in the European ambit, have permitted the discipline specialization in the elaboration of territorial designs. The present article aims at evaluating the territorial design knowledge and know-how systems that are being constructed in Brazil. Therefore, we will present the results of a study of three Brazilian experiences. This investigation shows difficulties and opportunities that are inherent to the Brazilian context, characterized by social and economical dynamics that are rapidly changing. The main result of the study is a set of challenges that the Brazilian scientific community has to face in order to improve territorial design in Brazil and contribute to the international debate with original elements.

••• Territorial design, territorial development, emerging economies, research, teaching •••

Globalization has been highlighting the central importance of territories and of the investigation and elaboration of their development models. In the last two decades, territorial development has become an object of great interest for several actors: institutions that govern them, stakeholders, organizations that act in them and their inhabitants.

In the current market globalization process, territories are seen as "enemy territories" that need to take a stand, trying to build and keep strong and differentiated markets. If small towns already suffered with the migratory process, which occurred in the middle of the

twentieth century, losing economy and population for the big cities, today the migratory problem is of planetarium scale. Territories in different parts of the world try to differentiate themselves to strengthen their markets and guarantee economic, social and environmental sustainability.

From this context, this article deals with the contribution of design to territorial development in emerging economies, specifically focusing on the case of Brazil as the study ambit. By presenting the experiences that the Brazilian scientific community of design has been carrying out in the territorial ambit, this article aims at assessing the knowledge and competence system that is being built in this context. The purpose of this investigation is to delineate and prospect the main challenges of design for territorial development, or synthetically, of territorial design.

The article begins with a theoretical review of the concept of territorial identity that is fundamental for all the studied projects. The perspective adopted in this analysis takes into consideration that the different components of the national identity mosaic are essential to implement territorial design in Brazil. It also should be taken into consideration that this mosaic evolves relatively fast if compared, for instance, with the European one. The Brazilian identity system, in fact, is less stratified and is subject to the strong socioeconomic tension that inevitably crosses an emergent economy.

The article continues specifically going into the territorial development sphere, highlighting the bases for a contribution of design to the valorization of territories. In his second session, a review about researches conducted in Europe and which are determinant for territorial design will be presented, until it gets to the work that is being developed in the Brazilian ambit.

Successively, the research will be introduced, supplying methodological indications about the study of the considered experiences, and consequently three cases will be presented. In the discussion of these three cases, the challenges for territorial design that were prospected are pointed out. Eventually, as a result of this investigation, central questions related to territorial design, and that can be explored in the future, are featured.

1. THE IDENTITY OF TERRITORIES AS THE MAIN LEVER TO THEIR VALORIZATION

The concept of territorial identity has been increasingly inserting itself as an object of reflection in many disciplines, especially those related to applied social sciences (such as economy, design and architecture), human sciences (geography and history) and agricultural sciences. The challenge of approaching the territorial identity as ambit of analysis is related to the myriad of dimensions associated with identity and territory, characterizing them as polysemous concepts. With the purpose of delimiting and offering evidence of the approach of this work, the following authors are quoted: Barjolle et al. (1988); Berque (1990); Appadurai (1990); Dematteis, Dansero e Rossignolo (2000); Magnaghi (2000); Santos (2003); Fagnoni, Gambaro e Vannicola (2004); Castells (2009).

From the sociological point of view, as Castells emphasizes, all and any identity is built. According to the author, the main question would be "how, from what, why and to whom this construction happens" (2009, 23, authors' translation). This way, reinforces Castells, territorial identities would generate a feeling of belonging and a cultural identity dependant on the existence of participation in urban movements of sharing common interests. Collective behaviors that are located in a territory and that distinguish themselves from others are also approached by Dematteis, Dansero e Rossignolo:

> The local system is not any part of a bigger system, for it has an identity that makes a distinction from the other systems. The subjects of the local system are aware of this identity and are capable of autonomous collective behavior [...]. The main function of a local system is not to produce goods and services, but to produce and reproduce itself. (2000, 88, authors' translation)

The social dimension of identity is evidenced by Magnaghi (2000, 148, authors' translation) when identity is defined as "a local, material and genetic code" and, still, as "a social product of territorialization" that "is constituted by the territorial patrimony of each place, economic, political, cultural and environmentally". According to this perspective, identity would be formed by buildings (monuments, infrastructure, cities, bridges, etc.), languages, myths and rites, religion and other elements that the author refers as "territorializing acts" of social and historical actors, stratified in a certain place, in which there is social and natural co-evolution.

Territorial approach refers to the concept of terroir, with origin in French, used to define a territory characterized by the interaction with man throughout the years, whose resources and products are strongly determined by soil, climate and cultural conditions. According to the French National Institute for Agricultural Research (INRA, 2002, authors' translation), the terroir can be considered as "a territorial being whose patrimonial values result from complex relations among cultural, social, ecological and economical elements that developed along time". This way, quoting Barjolle et al. (1998, 10, authors' translation), a terroir consists of a complex geographic space, characterized by three perspectives: a territory with its climate and soil conditions; an environment of knowledge and practices; a group of local traditions and customs.

The notion of terroir is represented as an important counterpoint to the homogenization process represented by globalization. Indeed, the tension between cultural homogenization and heterogenization is pointed out by Appadurai (1990) as a central problem of the global interactions. The author shows that, nowadays, all localities would be "drawn" and, therefore, it would be necessary to identify the dynamics that orientate the daily productions of the locality, withdrawing a group of principles that can direct a strategy of sustainable design.

In this context, in which territories are obliged to prospect an external market as a way of reactivating their internal economy and of providing conditions of sustainability for internal markets in a relation of interdependence with the new emerging markets, Güell (1997, 48) calls the attention to some challenges: to the effect of globalization that reaches cities regardless their scales; to the lack of instruments that reduce the social fracture; to the difficulty of small and medium sized towns with the development of information and communication technologies; to the lack of agility and readiness in the strategic management process.

2. DESIGN FOR TERRITORIAL DEVELOPMENT

From the considerations presented in the previous section, it is evident that "the territory does not exist in nature: it is a dynamic, stratified and complex success of successive civilization cycles; it is a complex system of relations between the resident communities (and their cultures) and the environment" (Magnaghi, 2000, 61, authors' translation). In other words, our presence in a place, as well as the presence of people who came before us and people who will come afterwards, mark, evolve and develop it.

Therefore, it is understood that territorial development is a possibility that can be longed for and reached, and not a condition that distinguishes some territories from others. Consequently, the scientific interest related to the territorial theme, and specifically to territorial development, increases. In this arena, design makes its rich system of knowledge and project competences available. Design comes close, knowing that other areas have more tradition in the study and treatment of territorial matter, that to treat it, interdisciplinarity is needed and that its contribution is specialized: design provides the technology of project process for the development of the territory to be projected (Franzato, 2009).

These studies were applied in diverse research and project experiences, such as the one called "LEADER" (acronym of Liaison Entre Actions de Développement de l'Économie Rurale). Promoted by the European Union, it aimed at conceiving territorial development strategies especially towards rural territories regarding the challenge of globalization (Farrell et al., 2001). Having involved many specialists from different areas and pertinent to different research centers in the whole Europe, the LEADER experience is a demonstration of the plurality of points of view necessary to proceed in the territorial development.

Many theoretical and applied researches were also conducted specifically in the design area. To our scopes, it is significant to quote the research ME.DESIGN, developed by a network of Italian universities whose objective was the study of the contribution of design for territorial development. This research focused specially on the strategic and methodological approaches of design to deal with the territorial realities in Southern Europe (confront Castelli et al., 2005; Fagnoni, et al., 2004).

Despite being determinant scientific milestones, these researches have been developed in developed countries along time from their background to the application in their countries.

In these emerging countries, however, the question of territorial development shall be inserted in another system of issues and opportunities. In these countries, consequently, design shall develop its own construct of theories and practices that can enable to improve its contributions in the special ambit of this system.

Especially in Brazil, due to its wealth in terms of cultural diversity and biological resources, the debate about the valorization of the territory is crucial. The necessity to develop strategies to protect and value the plural knowledge and the natural resources, looking for transformation and renovation alternatives, represents a great responsibility and constitutes a challenge for researchers and professionals (Krucken, 2009). In this context, it is a great challenge to channelize (acknowledge and latent) strengths present in the territory and support a proactive behavior versus the collaboration and integration of local interests, in a way that the innovations are accomplished and bring collective benefits. In this sense, the local products can also be considered cultural manifestations, strongly related to the territory and the community that produced them. They involve, therefore, material, immaterial, tangible and intangible goals that comprehend the cultural patrimony.

It is opportune to point out two documents that represent normative frameworks for the development of the territory through its identity expressions, and an indispensable reference for the operations of territorial design. The first one is the Convention for the Safeguarding of the Intangible Cultural Heritage of the United Nations Educational, Scientific and Cultural Organization (Unesco, 2003), that constituted the basis for the development of the Brazilian legislation associated with the theme. According to this convention, are part of the cultural patrimony: the specific ways to create and make (the findings and the genuine processes in science, arts and technology), the referential construction and exemplars of the Brazilian tradition ⁄ immovable and movable goods[1] ⁄, the immaterial creations (literature, music), the expressions and ways of living (languages, customs), places gifted with expressive value for history, archeology, paleontology and science, as well as landscapes and areas of environmental protection of fauna and flora.

Another important document is the "Plano Nacional de Promoção das Cadeias de Produtos da Sociobiodiversidade"[2] (Brasil, 2008), developed from an innovative initiative conducted by diverse Brazilian ministries, with the participation of representatives of the

[1] Under the form of material goods, patrimony is divided in two basic groups:
• Immovable goods such as: houses, churches, public buildings and buildings singly and in their set, to guarantee their visibility and fruition. In this roll are included the historical nuclei, the urban and landscape sets, areas of environmental protection, important milestones as references to social life.
• Movable goods that comprehend works of art, handicrafts, furniture and utilitarian objects.
[2] By "products of sociobiodiversity" it is understood "goods and services (final products, raw material or benefits) gener⁄ ated from resources of biodiversity, addressed to the formation of productive chains of interest of the traditional people and communities and of familiar agriculturists, which promote the maintenance and valorization of their practices and knowledge, and ensure the deriving rights, generating income and promoting the improvement of their life quality and the environment where they live" (Brasil, 2008).

producing communities and the scientific academy. This reference is especially meaningful for the megabiodiverse countries, as highlighted in the approach proposed by Krucken (2009), due to the centrality of the biodiversity resources for the economical development and the cultural identities in these contexts.

3. RESEARCH METHOD

The research starts from a set of territorial design experiences developed from the collaboration between researchers of Brazilian universities and institutions. We chose this academic approach because we intend to evaluate the construction process of an organic system of knowledge and competences in territorial design and its transfer to future professionals.

We performed a multiple case study, considering theoretical and applied researches, technical works, didactic activities and other academic experiences conducted between 2005 and 2011, especially in the southern and southeastern Brazilian regions. All the projects directly involved at least one of the authors of this article.

The different nature of the projects was considered inherent to the territorial ambit that enables multiple project approaches and strategies of activity conduction. With the goal of prospecting the challenges of territorial design in Brazil, we did not try to compare characteristics of the diverse cases, but to relate common problems and opportunities that characterize the performance in this emerging country.

The cases were written by the same authors involved in the experiences, following a specific script. After writing the cases, they were first analyzed by the authors separately, with their own system of references, and then in collaboration. The discussion of the cases is based on the triangulation of the various positions in face of the results.

4. ACADEMIC EXPERIENCES OF TERRITORIAL DESIGN IN BRAZIL

To elaborate this article, three experiences were selected: the applied researches "Biodiversity resources in the Atlantic forest" e "Carlos Barbosa 2030 Agenda", and the theorical research "Cenários para o Vale dos Vinhedos". All of these experiences had consistent project activities involving didactic or research activities in Design courses.

These experiences are quite diverse among them and deal with very different territorial objects. They were not chosen to evidence contrasts among them, but because they offered a lot of stimuli for debate. Through these experiences, it was possible to prospect diverse challenges of territorial design in Brazil. The three cases are summarized subsequently, from the oldest one to the most recent.

4.1. Biodiversity resources in the Atlantic Forest (various locations during 2008 and 2009)
This research was conducted during the years 2008 and 2009, and it involved activities with the communities of locations in the Atlantic Forest, by means of collaboration of the

researches Lia Krucken with the German Technological Cooperation Agency (Deutschen Gesellschaft für Internationale Zusammenarbeit, GIZ). It is opportune to emphasize that this research was conducted as a transversal activity in the ambit of a governmental project[3] developed by Rede Juçara, supported by the Environmental Ministry. In a subsequent phase, some activities related to the identification of the contributions of design for the valorization of resources and territories were also developed with the support of the State University of Minas Gerais.

One of the greatest challenges of this project was the amplitude of the territory being analyzed, condition that may be considered as a common characteristic of some territorial projects in Brazil.

The Atlantic Forest is the second largest Brazilian forest in extension. It is considered as one of the overriding areas for biodiversity conservation due to its high biological endemism and to the great risk of destruction of its environment (Myers et al., 2000). The growing awareness of loss risk of the natural and cultural patrimony of this territory has been encouraging project development to support the local production and the traditions of the communities, as well as the valorization of the territory itself.

The Rede Juçara is an articulation of organizations and producers who work with the sustainable use of the Juçara palm tree (*Euterpe edulis*) in the Atlantic Forest Biome. One of the focuses of this network is related to the promotion of products of the socio-biodiversity (through the development of productive chains of fruit and seed pulps), allied to the conservation of the species. These resources and their products aggregate a set of activities, social relations, stories and rites, and assume strategic value, strongly contributing to the economy of the regions where they are produced.

Some of the main actions that the designer can support and develop to valorize territories and products of biodiversity that originate from them are presented in Fig. 1. This scheme was adopted as one of the references for the research.

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[3] The governmental project N. 023-PRMA was supported in 2008 by the Environmental Ministry in pilot project for the Protection of the Rainforests of Brazil. The project "Sustainable use of the Juçara palm tree as a strategy to preserve the Atlantic Forest" had as component the Instituto de Permacultura e Ecovilas da Mata Atlântica - IPEMA and coverage área constituted by Osório, Riozinho, Rolante, Maquiné, Terra de Areia, Torres, Morrinhos do Sul, Baixada Sul Fluminense, Paraty, Angra dos Reis, Vale do Ribeira, Sete Barras, Eldorado, Litoral Norte, Vale do Paraíba, Ubatuba, São Luiz do Paraitinga.

FIG. 1. EXAMPLES OF DESIGN ACTIONS CAN CONTRIBUTE TO INNOVATION APPLIED TO TERRITORY
(SOURCE: KRUCKEN, 2009).

Specifically in this research, the main focuses were to identify the products and their qualities and to conduct critical analysis of the identity and tradition elements associated (actions represented in the stages 1 and 5 of Fig. 1). The activities were achieved through the conduction of workshops for representatives of the twelve communities.

The first workshop was presented in 2008 in Quilombo do Campinho in Parati (RJ) and one of the results was the collective elaboration of Fig. 2, in which roles and associations related to this plant and territory[4] are highlighted.

[4] The planting of Juçara palm tree is related to environmental protection through the conservation of soil and feed of the fauna, production of water and pollution control. This palm tree is considered as a key species of the ecosystem and is in the food chain of tens of birds and mammals, as well as of the animals that feed on them. Threatened of extinction, it has been an easy prey of illegal heart of palm collectors who rob the heart of palm. Nowadays, the Juçara palm tree is considered an icon to promote the sustainable management of natural resources and generation of income allied to the preservation of the Atlantic Forest.
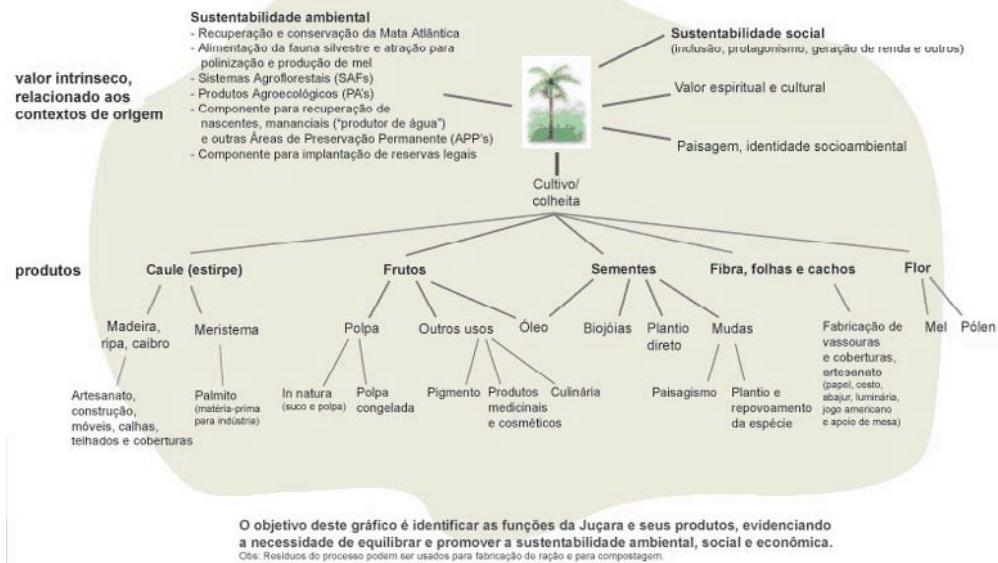
FIG. 2. RELATIONS OF THE JUÇARA PALM TREE WITH ENVIRONMENT AND SOCIETY (SOURCE: KRUCKEN, 2009).

The development of strategies of valorization of this species and its products along with the producers, consumers and society in general is essential (action represented especially in phases 3, 4 and 6 of Fig. 1). The analysis conducted with the communities showed the possibility of working preferably with some products (fruit and seeds). In this sense, one of the activities done was the analysis of the value chain of the pulp of the Juçara palm tree and the identification of possible intermediation strategies.

Subsequently, a complementary research was conducted, focusing on the analysis of a) similar products and commercialization strategies, and b) communication of products of sociobiodiversity and derivatives of similar species, such as açaí fruit (Bahia, Krucken, 2010). As synthesis, it is possible to highlight some of the main interventions of design in this phase of the project: a) the support to the development of collective representations (identification of elements associated to the Juçara palm tree, to the producing communities and to the territory of origin; map of the value chain of the pulp production) and b) the analysis of the strategies to make the product and the territory visible (identification of the identity elements associated with the natural and cultural patrimony of the territory, analysis of possibilities of intermediation and communication, analysis of potential stakeholders in territorial projects).

Some general considerations about this initiative refer to the importance of: a) the

protagonism[5] of the inhabitant communities of the territory and their capacity of self-organization in search for solutions to valorize local resources and products, and this way, contribute to the preservation and valorization of the territory; b) the existence of support and fomenting lines for projects of this nature, which are characterized for being collaborative and collective. Indeed, one of the greatest challenges for the designer is the development of methods and instruments to interact in the development of solutions that approach products and territories simultaneously, in which stakeholders have multiple interests that need to be made compatible. Another important aspect refers to the kind of expected results from the conduction of territorial projects. Due to being very transversal and complex, the general evaluations of territorial projects are a challenge, as well as the identification of the specific results of design interventions (Celaschi, Krucken, 2010).

4.2. Scenarios for Vale dos Vinhedos (Bento Gonçalves, Rio Grande do Sul, from 2008 to 2010)
The theoretical research "Vale dos Vinhedos" was conducted from 2008 to 2010 at the Unisinos Design School, under the coordination of professor Paulo Reyes, during his work in the Post graduation course in Design of this institution.
The Vale dos Vinhedos is located in Rio Grande do Sul, among the cities of Bento Gonçalves, Garibaldi e Monte Belo do Sul. It was the first region in Brazil to obtain the indication of origin for its fine wines.
The goal of the research was to think about the future of Vale dos Vinhedos, using the project methodology by scenarios developed in the design area. The project by scenarios consists in a methodology that deals with the uncertainty of the future environment and not with the evident predictability. Scenarios allow thinking about the future from the tensioning of diverse strategic resolutions. To Morin, from a pre-constituted view, the strategy enables "to predict certain number of scenarios for action, scenarios that shall be modified according to the information that will get tot He course of action and according to the chance events that will occur and disturb the action" (2005, 79).
The research talked to APROVALE, the association that administers this territory, created in 1995 from the union of six wineries, with the goal of reaching the indication of origin. In this process, the wineries invested a lot in mechanisms to improve the quality of the grapes, the wine and the infrastructure for wine tourism. The achievement of the indication of origin of Vale dos Vinhedos became the guarantee of origin with quality. The title brings good advantages for viticulturists and viniculturists, and especially for consumers and visitors of Vale, who find a developing infrastructure of customer service,

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[4] Other projects have been developed in an autonomous way by Rede Juçara and one of the main focuses has been the internal communication (with communities that live in the territory) and external one (with diverse public and society in general). The elaboration of a website as an interface of communication and contact, as well as the development of a dedicated magazine are examples of significant results reached by these communities in collaboration with their partners, such as the communication agency Coletivo Catarse.

respect for nature and the tradition of colonial products, grapes and wine, fruit of the Italian tradition and culture.

From the data collection with users and local producers, resulted two axes that organize the scenarios. One, based on the "economic value of the territory", represented by its respective polarities "patrimony" and "speculation"; the other, based on the "cultural value of the territory", represented by its respective polarities "tradition" and "innovation".

The crossing of patrimony and tradition resulted in the scenario "familiar winery". This scenario represents the effective valorization of the territory by the local traditions with the effective stimulus of the government. The crossing of patrimony and innovation resulted in the scenario "technological winery". This scenario represents the insertion of technology and the knowledge of the local productive processes. The crossing of speculation and tradition resulted in the scenario "cultural devaluation". This scenario represents the effect of the high speculation in the local territory. The crossing of speculation and innovation resulted in the scenario "glamour". This scenario represents the advance of speculation investing in values out of the local tradition, changing the original territory. These scenarios are represented in Fig. 3.

FIG. 3. SCENARIOS FOR THE VALE DOS VINHEDOS (SOURCE: REYES' RESEARCH REPORT, 2010).

These scenarios should be read as an only process and not as antagonic situations. That said, we can think that if Vale dos Vinhedos received some kind of support that would

benefit and stimulate the local culture, as value, two exits could be generated: the first, which keeps the colonist in his/her land and keeps the local tradition passing from father to son (familiar winery scenario); or, with the help of SEBRAE or universities, encouraging and forming new competences from the local values (technological winery scenario).

At the other end, we can think that if tradition is disregarded in relation to the high values of land investments, we can get to two complementary situations: the first, speculation corrupts local tradition overvaluing the land and transforming it into small farms for leisure or luxury condos for holidays (cultural devaluation scenario); in the second situation, speculation is invested in values that are totally unknown in the local tradition, producing contrary scenarios and realities without local recognition (glamour scenario).

The contribution of design is in two fronts: in the methodology that allowed the construction of these scenarios and in the constructions of derivatives that will feed the debate with the ones interested in the Vale dos Vinhedos.

4.3. Carlos Barbosa 2030 Agenda (Carlos Barbosa, Rio Grande do Sul, 2011)

The applied research "Agenda Carlos Barbosa 2030" was conducted in 2011 by the Unisinos Design School for the city hall of Carlos Barbosa (RS), under the guidance of professors Fabrício Tarouco, Carlo Franzato, Fabio Parode and Leandra Saldanha.

Developed to aid the strategic planning of the city, this research's goal was the definition of development guidelines during the following tem years. Such guidelines should consider the current territorial context, the citizenship value system and its aspirations, besides the regional, national and global urban development tendencies. From the defined guidelines, the goals of the city for the next decade and the necessary actions to reach them were unfolded.

The researchers were divided in four teams, each focused in different territorial issues (infrastructure and services, sustainability, culture and demography). The teams worked in direct contact with the secretariats and other stakeholders about the considered issues.

The researches were interpreted during two project workshops along with students from the undergraduate, graduate and masters courses in Design. The first workshop focused on the exploration of the guidelines (well-being, culture, sustainability, technology and entrepreneurship) (Franzato et al., 2011). The second workshop focused on the exploration of the goals and the relative actions (Tarouco et al., 2011, 53-91). The network of goals (in green background) and actions (in gray background, with icons) was synthetically represented in Fig. 4.

The main result of this experience was a report that included the researches, the description of the developed process, the guidelines and the action plans. (Tarouco et al., 2011).

FIG. 4. NETWORK OF GUIDELINES AND ACTIONS PROSPECTED IN THE RESEARCH (SOURCE: TAROUCO ET AL., 2011, 59).

During the reflection about this experience, it became clear that the work was ordered by the city hall in a very special context: its administration had sensed the importance of thinking about the future strategically and in long term, but they did not have those specific competences.

In the research phases, it was given special relevance to specific aspects of the territorial capital of Carlos Barbosa. It was accentuated the difficulty of the local community to identify opportunities of economic and social growth supported in shared identity values (the city is of recent origin with Italian and German immigration in the second half of the 19th century, and has had municipal autonomy since 1959).

In the project phases, the designers were mainly inspired by more significant identity traces to detail the city's culture. After this was verified in the first workshop, the organizers of the second one started from the interpretation of the identity of Carlos Barbosa to get to the elaboration of an action plan and to the representation of these actions.

The visualizations elaborated in the project phases were useful to facilitate the intern dialogue to the work group with the interlocutors of the city hall. Anyhow, it was

important to supply the dialogue with quantitative data. Despite this research having used an essentially qualitative strategy, the quantitative analyses gave more confidence to the interlocutors.

After presenting the report, we can register that it was welcomed wit interest by the city hall and interest bearers involved in the experience. At the same time, however, we still cannot evaluate its effectiveness. In this sense, there is the doubt that political turnover, surely natural in a democratic context, can become an obstacle for the use of the results of the research.

5. DISCUSSION

From the analysis of the three presented cases, some challenges and opportunities in relation to the performance of the designer in territorial projects were raised and presented in the form of open questions.

They can be classified according to their nature, such as: technical (in relation to the approaches and intervention strategies) and contextual (in relation to infrastructure, local culture and politics and to the future vision of the territories). Besides that, the inherent challenges to the transversal ambit of territorial projects are highlighted, which can demand quite complex interactions with the diverse stakeholders during the project, amplifying the amount of time necessary for its accomplishment.

In relation to the technical challenges, the main questions resulting from the analysis were:

a) How to promote the insertion of the design approach in the planning and territorial development dynamics?

b) How can design make its competences available?

c) Which would be the reading key for territorial design in Brazil? From which approach can past, present and future be considered in territorial design?

d) How to evidence the results of investment in design in territorial projects?

In relation to contextual challenges, the following questions were raised:

a) How to contribute to promote a strategic long-term view of the territory? How can we pass from the action in the present to the project of our future?

b) How to transform the heritage of Brazilian participative politics in an efficient social technology?

c) What are the peculiarities of the Brazilian system of interorganizational relations? What are the most appropriate governance models in the Brazilian context?

d) How to contribute to develop a culture of preservation and valorization of the public space by part of the society? How to foment the use and sharing of common assets?

e) How to promote the continuity of territorial projects along the political changes of governmental management?

These open questions constitute common challenges identified in the research and in the practice of territorial design. Advance opportunities are related to technical development by design, in terms of approaches, tools, interlocution and acting strategies; to the awareness of the importance of the territory as a public asset and as a natural and cultural patrimony; and to the development of synergy strategies between the specialists of different areas and the involved actors and institutions.

FINAL CONSIDERATIONS

The cases presented here allowed a collection of challenges and opportunities in relation to the acting of the designer in territorial projects in Brazil. The diverse focuses adopted – valorization of the product chains, of the sociobiodiversity, projection of future scenarios and preparation of a municipal event planner – show a multiplicity of possibilities of acting of the designer and the tools that can be used in this project ambit. In this sense, it can be considered that there is a wide potential in terms of technical advances (in relation to the development of approaches and intervention strategies) and of the integrated management of the territory (improvement of infrastructure, awareness of the importance of public assts and the natural and cultural patrimony, strengthening of politics and of the future vision for the territory). A fundamental issue that the cases presented here show is the active participation of the community and the stakeholders in the development of projects. Therefore, it is highlighted the importance of promoting the interlocution between the different actors in the development of collaborative solutions that can generate social technologies applicable to the context of emerging economies.

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EMERGENCY HOUSING IN ECUADOR, A CO-DESIGN DIDACTIC EXPERIENCE[1]

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Design is often considered as the crossroads of different disciplines. The designer has therefore played an increasing role as coordinator of different skills, assembler of semi-finished materials to be combined in new and specific configurations. In this context, the design of systems for the production of prefabricated systems for emergency housing is one of the central themes in the global scenario of design industry and project co-operation.

The didactic experience, which is shown below, was carried out within a collaborative programme between the Faculty of Architecture of the University of Naples "Federico II" and the Technological University Equinoccial (UTE), Facultad de Arquitectura, Artes y Diseño in Quito.

The design activity has been directed to solve a real problem of emergency housing, located in the Ecuadorian reality, through the integration of advanced industrial technologies and local traditional techniques.

••• Low environmental impact, technological simplicity,
reversibility, self-construction •••

[1] This paper represents a common work by all the three authors. Nonetheless Alfonso Morone wrote paragraphs 1 (Design Process) and 4 (Solving); Pietro Nunziante wrote paragraphs 2 (Technology) and 5 (Conclusion); Roberto Saravia wrote paragraph 3 (Scenarios).

1. DESIGN PROCESS

The didactics experience, which is shown below, was carried out within a collaborative program between the Faculty of Architecture of the University of Naples "Federico II" and the UTE Universitad Technological Equinoccial, Facultad de Arquitectura, Artes y Diseño in Quito. Within this joint program between the universities, was established a course of Technology of Industrialized construction process, oriented to design systems for emergency housing, the program saw the participation of teachers, researchears and students of both universities.

The design activity has been directed to solve a real problem of emergency housing, located in the Ecuadorian reality, through the integration of advanced industrial technologies and testing of local traditional techniques. Each group of Italian students was associated with colleagues at the UTE, which have provided the necessary knowledge of the actual local situations, then sharing the concept, the design evolution and representation. This collaborative workshop, has been made possible by video conferencing connections that enabled an ongoing relationship between the components of the working groups, followed by a stage of collective seminars.

Within the Ecuatorian reality, three specific scenarios have been established, related to the concept of emergency housing. First, the condition of so-called "*invasiones*", linked to the process of self-construction of settlements that characterizes suburban areas of large cities as Quito and Guayaquil.

This situation is comparable to many of Latin American urban sprawl, commonly known as "favelas". The other two case studies, are those of specific geographical regions of Ecuador; the coastal area and opposite that of the Andean sierra, where the reality of living of the majority of the population, is characterized by a continuous emergency situation linked to in security and this is the result of a self-construction housing stock that fails to meet permanently to the climatic conditions and idro-geological and seismic risk factors.

Beyond the sites location, the design methodology was direct on the edge between the use of innovative technologies combined with local resources and materials. The results are mainly related to the use of bamboo and other vegetable fiber, such as guadua mimbre, or for which were sought an opportunity of integration, especially in the junction nodes, with industrial materials such as aluminum, steel and synthetic fibers.

This latter approach has been moving towards a concept of economic, technological and social aspects of the design process, finally free of any universality, it is the most interesting result of the whole didactics experience.

From the general organization statement now it is possible to specify in detail the steps and the timing through which the didactic process was developed: specifying what activity has been made on line and those on site. The design process was developed along one year of study partitioned in four periods.
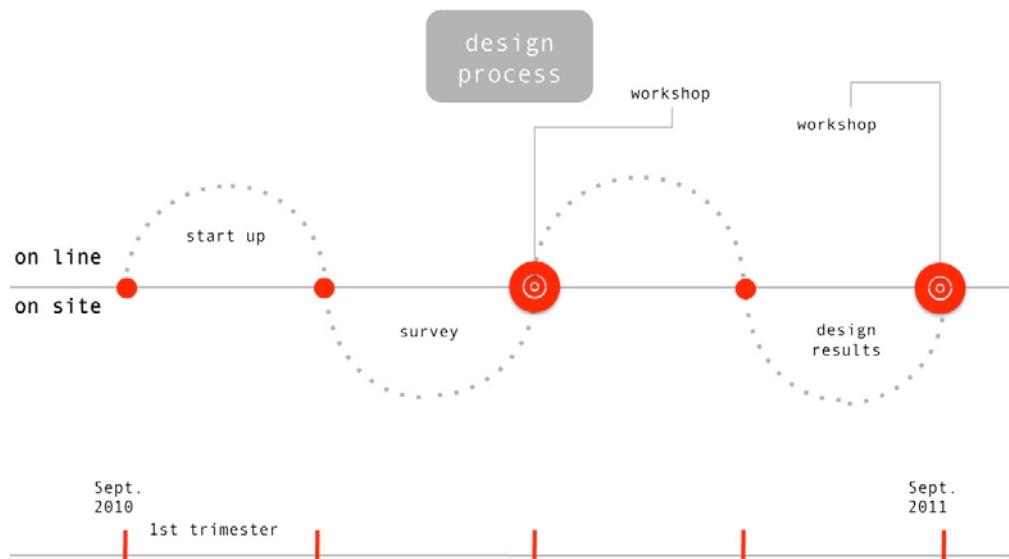
FIG. 1. DIAGRAM OF TIMING ACTIVITIES.

Start Up_ on line

At this stage working groups were formed; each group was composed by researcher-tutor and by students, organized in teams, from both universities, with similar training levels. In this phase the general objectives of the activities were set out, the social needs that the project must fulfil, identifying the stakeolders of the process, and the technological tools to share documents and a common online platform. The keywords of the process have been identified and information was transferred to the two working groups.

FIG. 2. PHOTOS DURING THE SURVEY ON SITE.

Survey_on site

This stage, working on the field, was conducted through the presence of Italian researchers in Ecuador and later through the visit of ecuadorian researchers in Italy. It was divided through:

· surveying sites of production and processing of raw material to be used in the design process;
· surveying to emergency settlements, built following disastrous volcanic or meteorological events, or in which they were employed prefabricated modules developed;
· contacts with the community of producers of natural fibers used in construction;
· contacts with research centres in the South American reality on experimentation with natural fibers applied to buildings;
· joint educational activities in the form of intensive workshop held at the UTE with Italian teachers and at the University Federico II with ecuadorians teachers.
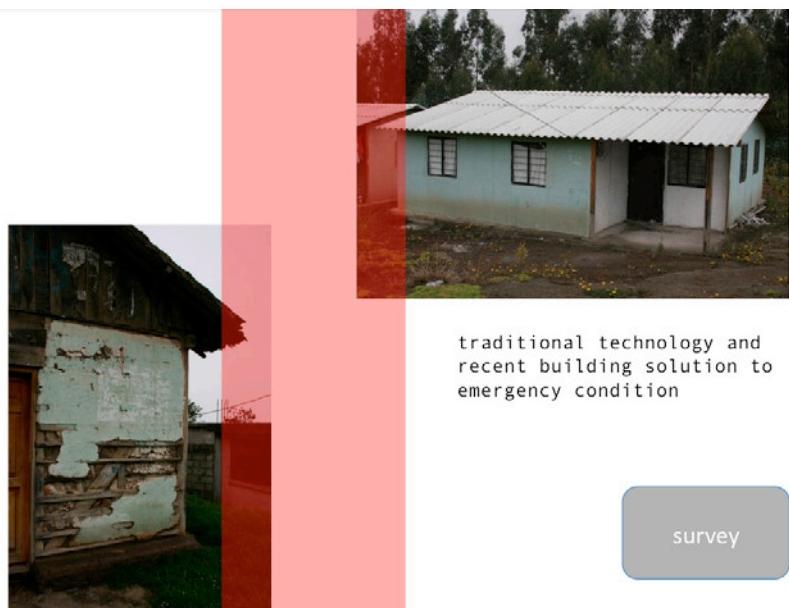
FIG. 3. PHOTOS DURING THE SURVEY ON SITE.

Transfer Information_on line

In this phase the information at the base of the design process were conveyed through frequent online meetings between the various working groups and seminars single-issue. The project activities were presented collectively through videoconferencing modes, so as to provide moments of sharing the work in progress.

Design Results_on site

This point has been characterized by an early formalization of the design process. Three local situations have been analysed, in order to create a sample of a more general condition common to many geographical realities, characterized by low technological diffusion and the need of cost reduction. We proceeded to joint processing solutions and constraints: industrialized, small and transportable houses that can be built into a local geographic context, in places where there isn't a technology or where it is necessary to build in a short time. Common objectives to the various proposed solutions were the lightweight, modular, extreme speed of construction and simplicity in assemblage, in order to allow an easy "do it yourself" directly by end-users, in a perspective of sustainability. The next effort is to ensure the feasibility, in situ, of project proposals and to provide the tools for their management.

2. TECHNOLOGY

The technology does not have a neutral role, in our design process, restricted only to the building process. It is a key component, in the picture of definition of sustainability, which involves firstly a social plan. Natural fiber technologies, using local skills, will generate a productive community, guaranteeing social cohesion and wellbeing. In particular the field of manufacturing bamboo in Ecuador, represents a productive field, which is strongly linked to the needs of integration between traditional approach and advanced industrial culture. In recent years, many initiatives are oriented to the development of a genuine industrial activity in this sector. There are currently only few studies that analyse the quantitative dimension of the activities of bamboo in construction technologies. The knowledge of the productive field has therefore been developed through direct contact with micro-enterprises active in Ecuador, as well as through the available bibliography. This contact was held during the presence of Italian researchers in Ecuador in January 2011 and covered in particular the volcanic area of Thungurahua and the village of Penipe. Then, crossing bibliographic data and researches in field facilitated to reach a better understanding of local manufactures.

Thanks to the collaboration of researchers from UTE, the scenario of the research field has been completed, taking contact with relevant stakeholder groups (micro-enterprises, SMEs, NGOs, governmental organizations). The focus of this stage, during the field visit, was to gather information from the local stakeholders, in order to have a realistic approach to the use of local production of natural fiber. In this phase, interviews were developed without a specific statistical evidence; they have been used for purely descriptive purposes, excluding the quantitative results.

The results of this stage and the overall effect are contradictory. For example, from the viewpoint of management of raw material, there are many plantations of bamboo that are managed in a rational manner and others without a long-term vision. These considerations must be integrated with specific observations on macro-economic and social struc-

ture of Ecuador. The country, although with enormous natural resources, remains one of the poorest in South America and its economy has not yet stabilized after switching to the dollar in 2000.

The agricultural sector suffers, in particular, from a lack of industrialization, as demonstrated by the presence of a large workforce engaged in agriculture, approximately 30% of the total. Export is mostly based on commodities with little added value, like petroleum, coffee, bananas, cut flowers and shrimp. In recent years strong impulses to the industrial modernization of the country came from the electronics industry, particularly the software, and the academic research in aerospace. In particular, exports of semi-finished products resulting from bamboo are a major obstacle in the absence of appropriate certifications, and energy sustainability-related materials, mechanical, relatively to their static capacity. A further obstacle to extensive dissemination of bamboo is also given by the current scarcity of raw materials. Some programs of social housing as "Hogar de Christo" (E. Cárdenas and C. Marlin, Diagnostico de la Cadena Productiva de la Caña Guadúa en el Ecuador. SNV, Quito 2003), in recent years have used large amounts of Guadua (native bamboo, woody fiber particularly suitable for use in construction). These circumstances justify the fact that the use of bamboo in exports in Ecuador is still limited to handcrafts, small decorative items or tools. Moreover, today the most important producers and exporters of bamboo remain the Asian countries with China which first country producer for over 75% of the world total, followed by other countries such as Thailand, Indonesia and the Philippines, property in Malaysa, while the South Americans, Ecuador and Colombia in the first place, have a marginal role.

Plantations and agricultural conduction mode
One of the major limitations found in current conduction mode of bamboo plantations in Ecuador, is the absence of a scientific approach. This entails the withdrawal of bamboo randomly taking too young or, conversely, too old. The exploitation of resources occurs mostly in the absence of control and international certifications, this runs the risk of lead to a gradual and irreversible depletion of the forests. Another risk is given by the question of the use of bamboo for low value added applications. This is the case of using bamboo stems such as support for banana plantations. This could give rise to a lack of raw material for applications with higher added value, as in the case of constructions. In any case the rationalization of the processes of agricultural business could lead to an increase in the production of bamboo enough to cover the entirety of requests. In Ecuador is widespread the Guadua bamboo, a variety of very strong bamboo, particularly suitable for structural use. For the high mechanical characteristics of this variety, many Asian countries with similar climate conditions, are launching the planting of Guadua. There are however other species of bamboo native to Ecuador and Colombia 's, and not yet widely exploited, as *Dendrocalamus asper* or Bambusa tulda.

FIG. 4. PICTURES FROM THE PROCESSING STEP.

Processing

In the phase of processing, the most current limit lies in the lack of knowledge and dissemination of techniques of protection from attacks by insects and fungi. Other weaknesses are present in the dissemination of drying technologies. The use of machine tools has been developing in Ecuador, improving and modifying those already in use for wood, for the processing of Guadua. Particular attention is given to those tools that allow you to exploit the natural elasticity of bamboo for curved shapes, which can generate interesting spatial solutions. Another fundamental limit found in the Ecuadorian production system is the poor attention to the certifications that attest the proper observance of the rules of safety at work during the phases. In many factories there is not still attention to the worker's safety, the levels of dangerousness refer both to the absence of safe electrical outlets, and to the use of poisonous chemical additives and adhesives, as well as to the unhealthiness of working environments excessively noisely or dusty because of sawdust in suspension.

Especially abroad, the bamboo is seen as a decorative material, of exotic origin. For consumers in Western Europe such material is associated with features such as sustainability, durability and rusticity. But this image, especially thanks to the variety of Guadua bamboo, is changing and evolving towards a perception of potential structural material. The image of a "poor" material suitable for secondary uses and folklore is exceeded because the Guadua is a material that has some very interesting architectural features, related to its elasticity, mechanical resistance and lightness. These features make it a very attractive material

for anti-seismic structures.

Guadua bamboo is a genus of Neotropical family Poaceae and is characterized by green stems and gnarly, by a large diameter (between 10 and 35 cm at the base of the stem) and a height that ranges from a few tens of centimeters (shoots) up to about 25 meters. Found in South America, particularly in the river basin of the Amazon, it grows in moist places, such as rainforests, savannahs and tropical Plains, at an altitude not exceeding 1500 meters. The Guadua employs from three to six years to develop completely. It is not only a flexible and durable material, but it also has a fast growth and an amazing ability to multiply itself, thanks to the presence of numerous buds. Its strength makes it an ideal replacement for wood in the construction industry and the fall of its abundant foliage contributes to increased production of biomass, thus making the Guadua an alternative fuel for power generation. In an environmental context, this variety of bamboo covers very important functions: it absorbs a substantial amount of CO_2; it filters the waters and retains a portion that is released gradually into the subsoil; it keeps compact the soil through the roots, thus limiting mudslides, landslides and dispersal of mineral salts, useful nourishment of nearby vegetation.

In some Latin American States, the Guadua was used as a building material since the early years of last century, for the construction of huts and scaffolding. Due to the low cost and easy availability of the plant, there was the problem of deforestation and drought of the places where was absent a specific regulation on pruning, pushing the scientific community to develop a new method in the laboratory of plant cultivation. Recently, Guadua was reevaluated by architects and designers, thanks to its special physical characteristics (it is a material resistant to earthquakes) and employed in ambitious projects of eco-compatible architecture, because it meets the requirements of sustainability, which contribute to the respect of the balance between the works of man and the environment in which they are placed: the Guadua is a natural and renewable resource that does not cause emissions harmful to human health and the entire ecosystem, which can be used in building flexible and resistant structures, for which there is no need to resort to an irresponsible use of petrochemical origin (high impact pollutant). Of course the performance improvement of this variety of bamboo requires expert interdisciplinary effort aiming high technology for quality and innovation of production processes of this new building material for many defined "steel plant".

The current limits to the use of Guadua structures are linked, once again, to certification problems, constant quality and durability of semi-finished products. As well as for structures the Guadua is used for floorings and finishings. In the field of prefabrication and temporary structures, the stem of the bamboo is used for the realization of complete closure panels, starting from the structure until the completion of the closure. One of the risks in the use of bamboo in construction is tied to its scarse resistance to fire attacks. Starting from experiences developed first in Asian countries, Ecuador has witnessed in recent years a

strong research towards innovation. First of all it is expressed in the combined use of bamboo with industrial materials such as steel, structural nodes. Another area in which there was a strong testing and experimentation was the creation of laminated parts, where a big hurdle is the use of unsuitable glue, or the need to select the axes in bamboo, according to age and section. Compared to the experience carried out on the Asian bamboo species, the South American ones, like the Guadua, have greater hardness and resistance. This entails the possibility of achieving higher planking in size with very high mechanical resistance. These characteristics represent an important premise to the increasingly widespread use of bamboo structures. In recent years an important training aid was offered by the presence of Chinese instructors, present both in bamboo plantations than in processing and production in Ecuador. The awareness by the Ecuadorian Government of the importance of the dissemination of bamboo in a project of development of many rural areas, has led to the establishment of an advisory body for the sector of bamboo, ' the Bamboo's Advisory Council, run by the Ministry of agriculture.

3. SCENARIOS

on line

scenarios

spontaneus settlments: invasiones, idrogeological risk, vulcanologic risk

- "invasiones" around urban areas
- the coastal area
- the vulcanica area,
where the reality of living of the majority of the population, is characterized by a continuous emergency situation linked to insecurity the result of a self-construction housing stock that fails to meet permanently to the climatic conditions and idro-geological and seismic risk factors
 on site

FIG. 5. SINTHESIS FROM THE THREE DIFFERENTS SCENARIOS.

3.1. INVASIONES

Although historically Ecuador is a country with a strong agricultural economy, currently the urban centers are the places of greatest concentration of the population. This trend is

similar throughout Latin America and has grown since 1950. In those years, the country began to develop a new economic model, which prompted migratory waves from the countryside toward urban centres, changing radically the social structure of the country. This process, founded on the process industries, commercial activities and services, has been pushed up to the present day. Currently export capacity is linked largely to the coming of oil, and a few other primary goods, and the process of modernization has led to the concentration of the population especially into two cities: Quito and Guayaquil.

Inside a common socio-economic process, each of these two large conurbations, has its own specificities which represent an attractive for internal migration flows. Quito is the capital of the country, where are located the most of the administrative structures, training and services of the State. Here are most of the Government, administrative offices, and universities. Guayaquil is the economic and commercial heart of Ecuador. Here the major banks have their headquarters and centres of economic representation.

For the size and speed of transfer of population from urban centres, as well as the poverty of resources, the migratory phenomenon occurred in a predominantly casual way, generating enormous problems of precariousness. The migrant population in major urban centres is installed in the vast majority in peripheral areas not urbanised, or within urbanized areas in abandoned areas, resulting in spontaneous settlements surrounding the consolidated urban nuclei. Just to indicate the vehemence and absence of programming of these settlements, they are commonly called "invasiones". If these settlements develop within the consolidated city in peripheral areas of new employment, they give rise to marginal areas with huge social problems.

Urbanized centers "les invasiones" focus in abandoned buildings of the historical center, very often in precarious static and completely lacking basic services, with a lot of problems of delinquency. "Les invasiones" suburban areas are concentrated, residual areas between the main urban areas, in difficult places for the urbanization, such as slopes or estuaries of small streams. The materials used are still out of town, being mainly waste materials recovered in landfills. These areas, in the absence of primary services such as sewers, running water, electricity, have enormous health problems. The solution that you would like to pursue is to create permanent settlements, eliminating the reasons of insecurity. A first job, in this sense, would be to think of low-cost housing, mainly in bamboo wood. Another factor should be the simplicity of building components, in order to allow an easy DIY process.

3.2. COASTAL ESTUARIES AREA

Another specific scope of housing precariousness of Ecuador is one of the several coastal estuaries, whose shores are places of human settlement. These settlements, for the absence of any planning, show the risk of compromising unique natural sites, characterized by an exceptional biodiversity. To adapt to the condition of the land, subject to frequent floods, the dwellings are made mainly on shelved items (stilts). Also in this case the vulnerability

manifests itself through the use of waste materials. The houses are very precarious. For the precariousness of housing, the frequent floods create disastrous effects. Precarious settlements on the coast are devoid of any basic service: water, electricity, sewerage etc. The same uncertainty is found in the building materials used. The wood has no protective coatings against water, roofs are made of simple corrugated sheets that are easily uncovered during wind storms. This uncertainty causes the dwellings are periodically destroyed, only to be rebuilt.

The average size of dwellings is one or two rooms. The rooms are not differentiated, as simple common spaces in which, regardless, people can cook, eat, or sleep. There are no w.c., drinking water is brought through the tanks once a week and stored in each dwelling in containers. There are no sewers. Wastewater discharges occur directly outside. The consequence of this is a particularly unhealthy area. In case of frequent rains and floods or fires, these homes show all their insecurity. In these circumstances the homes must be quickly abandoned leaving the population exposed to all kinds of disasters. Given the fragility of these settlements on river estuaries, whenever they are damaged by natural events, must be abandoned and rebuilt elsewhere. This process is very expensive, because it involves moving a whole community and not only single families. In this case new areas have to be identified, with extensive facilities, infrastructures have to be created, etc. To avoid this cyclical process of destruction and reconstruction it would be necessary to work on the minimum dwelling units, replacing the precarious ones already existing. In this way, replacing and updating the housing, it would be avoided the cost, and the trauma of social reconstruction. This process for sedentary settlements, could avoid the consumption of various Territory areas.

3.3. ANDENEAN CHAIN AREA

Ecuador presents a large part of its territory in mountain areas belonging to the Andean chain. Here human settlements are exposed to extreme climatic conditions and a particular network. Nighttime temperatures and winter are especially strict, the winds are strong and rainfall, lower quotas, particularly violent. Also in these so disadvantageous environmental conditions, precarious urban settlements exist. Around urbanized villages and small towns, there are phenomena similar to "Les Invasiones". In the Andean region precarious settlements are concentrated mainly in the circle of peripheral villages. Here in the not yet planned and urbanized suburbs, precarious dwellings are constructed using small lots of land empty. This will create a real belt of misery around urbanized cores where everything is missing: services, water, electricity, and sewage. But these conditions are made worse by extreme climatic conditions. The presence of channels near the settlements leads to the fact that, during strong rains, houses can be dragged away by the strong current, during the winter season.

Even if you try to solve this problem, warning the population in advance at a time of

particularly extreme weather events, very little can be done. People who leave their houses don't have where to find shelter, and in any case the houses remain destroyed. They have designed evacuation plans. Infrastructure works of riverbed and canal, are progressively realized. But the solution can be found only by giving greater security to housing. Identifying, firstly, safer areas, distant from the rivers, on slopes. But then a crucial safety factor is the quality of housing. In this sense the use of Guadua in housing can provide a useful reply. Guadua has a relatively easy availability and a low cost. It can be worked in resistant and elastic structural elements. The use of wooden walls can then provide an efficient thermal insulation.

4. SOLVING

You find illustrated below three different design solutions, each corresponding to one of the three situations described in the previous paragraph.
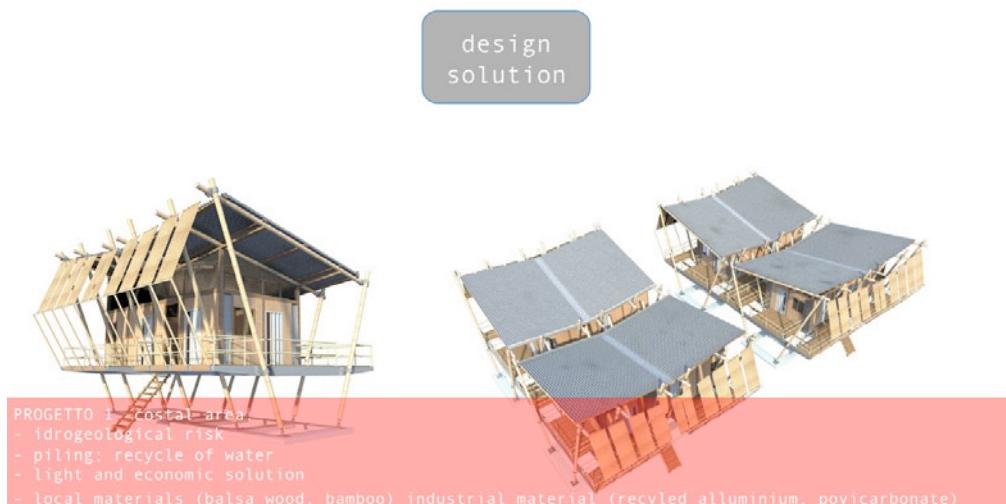
FIG. 6. DESIGN SOLUTION 1.

Design Solution 1

The project tackles the theme of precarious housing settlement in the coastal area. This area is easily vulnerable to hydrogeological hazards caused by severe floods and from periodic floods triggered by meteorological phenomenon known as "El Nino". The project reflects and is inspired by the typical means of displacement on water: balsa wood raft. The fundamental points on which rests the concept are: rise of the dwelling plan of campaign to prevent possible flooding, through a system to stilt house; recovery and recycling of rainwater; lightness obtained through a modular constructive system. Another important point is the dialogue between the traditional materials (wood, bamboo, balsa) and innovation (recycled aluminum, polycarbonate).

Design Solution 2

FIG. 7. DESIGN SOLUTION 2.

The project proposal has been designed for internal areas in the Andean area. It integrates traditional local technology of bamboo wood for parts in elevation, the use of aluminum for the links to the cover, made of corrugated sheet. The result is affordable, compact and lightweight, the housing structure rises from the ground by slender bamboo poles, creating paths linking the two modules that make up the type of housing. The structural system is supplemented by limited use of recycled aluminum in the form of plates and a corrugated roof. The structure creates a soothing and protective solution, easy to assemble, capable of providing a lasting shelter to the extreme weather conditions which may occur in the Andean region.

Design Solution 3
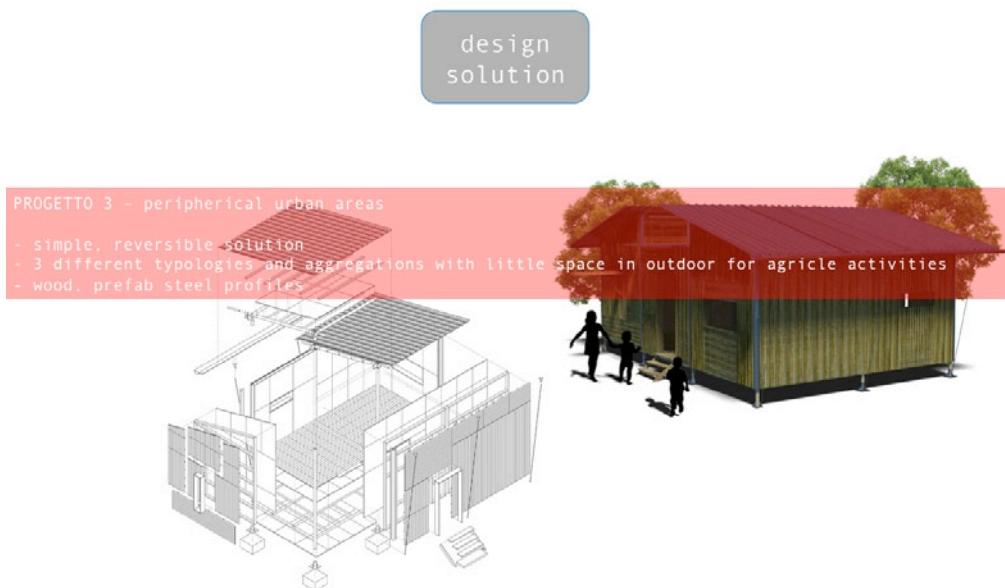
FIG. 8.DESIGN SOLUTION 3.

To resolve the problem of precarious housing in slums of urban suburbs of Quito and Guayaquil, they have developed a dwelling with low environmental impact, cheap, compact, reversible and easy to assemble. The main material used is the bamboo, in the form of structural auctions for coating panels and flooring. The project proposes three types of settlement involving the presence of a small surface area to be allocated to the garden, pandering to the tendency of the inhabitants to food self-reliance. The supporting structure is made with bamboo canes, which join a sub-tree in balloon frame that allows anchoring cladding panels. The cover is made with a tie held by sheeting.

5. CONCLUSION

We believe with that slums represent a kind of laboratory of the future, where you have to measure and test the ability of contemporary knowledge, its technology. Confront the opportunity to work for the improvement of the minimum conditions for survival and shelter. The design can't escape to search solutions for all those extreme conditions; that tend to make sustainable design practices related to emergency. This idea of the design process as a point of intersection between the social dimension and the project needs, we hope that develops hand in hand to the affirmation of ethical content of contemporary design.

The research proposal is geared to understand how guiding tools, in order to solve some of the problems of this era. Troubleshooting for temporary living conditions that the fast

urban growth pose, design in relation to climate change, for refugees and all those who suf-
fer from a scarcity of resources, to the extreme living conditions. Basically see how science,
technology and design can help the new paradigm of geo-design to become an eco-design
approach.

The work done here has led to a first field research. New modes of interaction between
groups of researchers and students in Italy and Ecuador have been developed, understand-
ing the potential in the use of natural fiber to built. It is limited to some fields of applica-
tion, in relation to the reality of Ecuador. They have developed some initial design solu-
tions, they have had to compare with a different reality, and so their colleagues.

Through these early activities, developing a first network between universities was pos-
sible. Another important result has been to engage within this associations and bodies
involved in Latin America which work with bamboo wood. This network is currently a
work in progress. The activity of growth and consolidation of the network is a first task we
have to face in the coming months. The project can go over the simple research objectives
and can take a concrete form. To do this we will need to identify sources of funding. A
schedule about the identification of cooperation measure is ongoing, and the project for the
call of EuropeAid Alfa program is on the table.

The outline of that project is a way to create advanced design centers in the study area.
Through the realization of a set of integration initiatives, between the scientific commu-
nity, local communities and productive sectors, we hope that could be the start of a pilot
project finalized to realize prototype in site thanks to the cooperation of all the stakeholders.
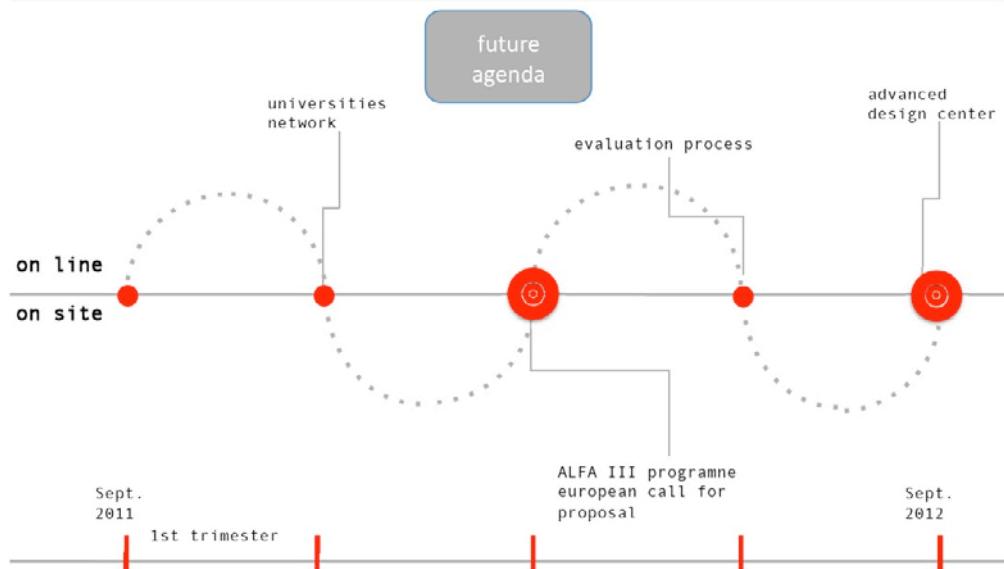
FIG. 9. THE FUTURE AGENDA.

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DESIGN LIVRE: CANNIBALISTIC INTERACTION DESIGN

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This paper provides a historical account of cannibalism as used to explain how Brazilians integrate foreign cultural influences into their own culture and introduces a design praxis based on it. From Modernism to Digital Culture, cannibalism is a recurring tactic used to overcome cultural traditions without throwing them out. It proposes the hybridization of old and new forms in festive celebrations. Design Livre is an approach that combines the principles of Free Software with design methodologies, aiming to enable participation in the design process by anyone. Sharing source-code is not considered enough to enable such participation, thus Design Livre goes back to the level of metadesign - the underlining structures of design process - to subvert formalism and maximize appropriation. An example of a cannibal ecosystem developed by Faber-Ludens is described to instigate questions on intellectual property in design, co-creation, embodied relationships, and culture.

••• Interaction design, cultural studies, open design, metadesign •••

INTRODUCTION
Interaction Design is known for spreading cultural sensibility around technology development. Instead of pushing new technologies, Interaction Design tries to bring the use culture into the technology development process. The goal is not to reduce cultural resistance and maximize adoption, but to provide an empowered experience where users have control over technology. Interaction Design aims at technology appropriation, not at technology adoption.

This essay reports on a collective experience of appropriating Interaction Design itself into technology development in Brazil. Based on their enrollment at Faber-Ludens Institute for Interaction Design, the authors reflect on the practice of cannibalism, which is a common aspect used to understand the particularities of Brazilian cultures. The metaphor is brought back once again to sketch the foundations for an authentic Brazilian Interaction Design praxis, which is being called by now Design Livre.

BRAZILIAN MODERNISM

To understand cultural practices, it's paramount to look at their historical origins. Any reasonable history of culture should go beyond facts, looking on how facts are produced – described, translated, distorted – by culture (Latour, 1979). It's still debated if cannibalism ever happened among Brazilian aborigines in the way Hans Staden (1999) reported, but Brazilians have retold that story whenever they wanted to repel colonization.

Brazil officially broke up colonization from Portugal in 1822, but the cultural influence from European metropolis continued setting the stage for urban life long after that. It took a while to overcome the colonialist practice of exporting raw materials and importing manufactured goods, a trade logic which also reflected on other relationships like language, ideas, and behaviors.

In a effort to overcome this logic, after independence, Brazilian intellectuals tried to construct an distinct Brazilian identity, using the image of native peoples as a source of authenticity. Aboriginal Brazilians were depicted by romanticists like José de Alencar as a peaceful and humble, capable of being grateful for the civilized lifestyle imposed on them. The ancestral European morality was reinterpreted into natural behavior through the image of the *good savage*, and the native peoples were seen as manifesting it in a pure form.

During the XIX century, Brazil received massive immigration originated from places other than Portugal and Africa. This movement increased the diversity of cultural influences, later explored by Brazilian financial elite whose progeny decided not to follow the traditional path of studying abroad in Lisbon, but in more cosmopolitan metropolis like Paris and London. They came back full of ideas on how to open Brazilian culture to the world, both in economic and artistic terms, but faced an unfavorable political environment. Critics didn't receive very well those avant-garde ideas. Those artists claimed that Brazil didn't need to wait for novelties to come from Europe, but could develop it by itself. The *Modern Art Week*, in 1922, was the epitome that united these artists under the rubric of Modernism, an international movement that acquired a very different flavor in Brazil.

Brazilian Modernism didn't declare war against all forms of tradition. Instead, it proposed the coexistence of multiple temporalities: the old together with the new. Martín-Barbero (2002) observes that modernity images that came from abroad were used to push forward the national project, which concentrated more on being a competitive player in the global market rather than having efficient governance or an egalitarian society. Slavery, consid-

ered to be anti-modern practice, was thus converted into low wage employment - a legal, but not practical, freedom. Modernism worked to integrate African-Brazilians, and other ethnic groups, through a multiculturalist discourse, which didn't offer any practical option other than to maintain the current economic structure.
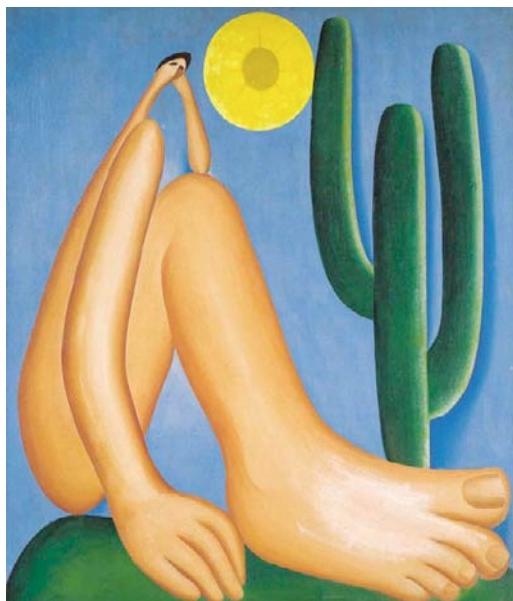
FIG. 1. ABAPORU, THE "MAN WHO EATS HUMAN FLESH" HAS STRONG ARMS AND FEET. TARSILA DO AMARAL (1928).

Among modernist artists, one group adopted the metaphor of cannibalism (referred as *antropofagia*) to explain, exemplify and justify the transformation of old traditions into new ideas and propositions. They relied heavily on the stories about pre-colombian native Brazilian tribes who ate captured enemies in post-war rituals believing they could get their strength into the tribe. The idea was to emphasize a certain manner of facing cultural influence: instead of denying earlier influences, and trying to create a "legitimate Brazilian culture", purified from any kind of external motivation, the modernists proposed to accept whatever influence – European or not, motivated by a very non-European ideal: the cannibal, which became iconic after Tarsila do Amaral painting (Figure 1).

A key text from this group is the Cannibal Manifesto (*Manifesto Antropófago*), written by Oswald de Andrade in 1928. The manifesto presented a theory of Brazilian culture based on hybridism and proposed a more coherent libertarian morality (Silva, 2007). Although Marinetti Futurism may have initially inspired Andrade, he was not seduced by the promise of an advanced society based on technological development. He knew that any determinism in Brazil would not be possible: "We never admitted the birth of logic among us", says his manifesto.

Interpreting Andrade poetry, Mirian Silva believes that the frequent usage of erotic and

radical images in his texts instigates bodily reactions from the reader:

> "The oswaldian Utopy establishes a place for the body, not an ideal place, but an open possibility for itinerary, a drifting itinerary, through the strategic appropriation of other bodies, which does not mean negating the other, but appropriating it for transformation, as well as letting others to appropriate of oneself body, the feasting metaphor, cannibalism." (Silva, 2007, p.87)

The Cannibal Manifesto has since been used as a key text to analyze Brazilian culture and understand the characteristic hybridism between multiple sources that constitutes Brazil's ethnic formation, as well as a frame of reference for the continuous effort to create a more indigenous Brazilian culture.

TROPICÁLIA

Along the XX century, media played a very important role in Brazilian national identity. While modernists were using newspapers to communicate with the few people that could read, populist president Getulio Vargas was using radio to develop an affective relation ship with the broad population. After half of the century, television became the most important medium for national integration, the only source of information for the majority of population. The military government that took the lead of the country from 1964 to 1985 used television intensely to advertise a rather different notion of modernity. The country needed to be modernized, not in the pluralistic sense of Modernism, but in a very clear direction: industrialization, transport and energy infrastructure and governance. The government controlled media and censored any attempt to question this political project.
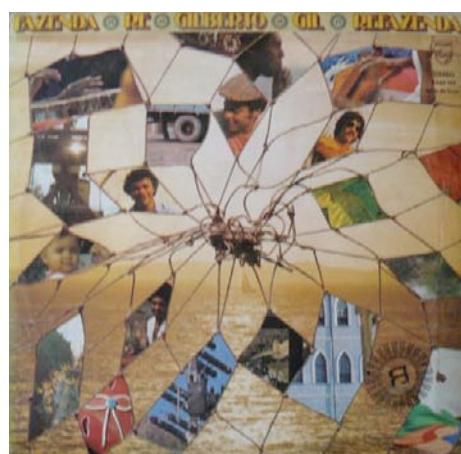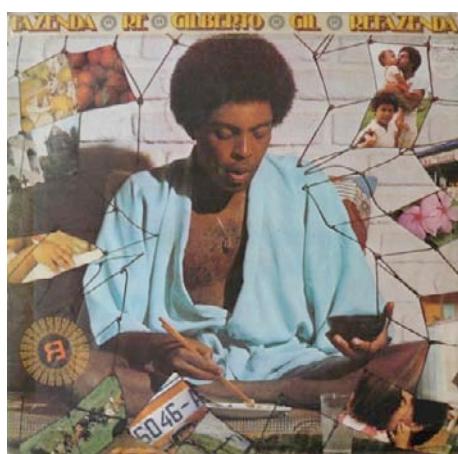
FIG. 2. THE COVER OF REFAZENDA MUSIC ALBUM SHOWS GILBERTO GIL EATING JAPANESE FOOD WITH AN EUROPEAN ROBE SURROUNDED BY A NETWORK OF INFLUENCES AND MEMORIES OF TRAVELING (1975).

It was a hard time for artists who wanted to push culture forward. Those who protested have been persecuted or deported. Nevertheless, one group of artists found on mixing Brazilian popular culture with global pop a mean for indirectly changing the monolithic mindset of that political scene. Tropicália artists experimented combining disparate references in every work, specially those references they met during political exile abroad (Figure 2). They made explicit allusion to the previous cannibalistic movement, but instead of delivering erudite works, they delivered pop works. Being aesthetically appealing and harmless to the dictatorship, Tropicália got a lot of space on media. Together with other countercultural flavors, such as psychedelic, spirituality and funk music, Tropicália had a lasting impact on clothing, customs and music produced in Brazil since the 1970's, opening a space for creative expression that could undergo the repressive political environment.

DIGITAL CULTURE

The cannibalism metaphor was brought back again to the cultural landscape when Gilberto Gil, a prominent artist from Tropicália movement, was appointed Brazilian's Minister of Culture in 2003. The National Culture Plan elaborated by his team mention it explicitly:

> "To live with such diversity is part of our history. Not coincidentally, the concept of cannibalism, originated from Brazilian Modernism, points to a peculiar ability to re-elaborate cultural symbols and codes from several contexts. Differently than other people of the world, we have a remarkable ability for hosting and transforming what is initially unknown." (Ministério da Cultura, 2008, p.10)

The plan highlights networked computers as a mean for including more people on cultural production. By lowering the costs of production and distribution, computers were seen as an alternative media for representing the diversity of Brazilian subcultures. The plan itself was debated online through an official website, where any citizen could give his opinion, an action with no precedents in Brazilian government.

By the time the plan started to be discussed, less than 13% of Brazilian homes had Internet access (CGI.br, 2005). Internet was used at work or at school, when available. It was not until the rise of social networks that Internet was considered a major entertainment media. The most successful social network in Brasil, Google's Orkut, motivated many people that never touched a computer before to go to lan-houses or even purchase their own computer and pay for Internet access. Orkut offered a personal profile, where any other user could leave a message. Because they were all public, users kept coming back to clean the profile from undesired messages and to update friends about changes in their lives. Orkut had also user created communities, a shared spaces where any topic could be discussed.

Being originally targeted at the United States market, Orkut was the scenario of a symbolic war between Brazilians and Americans. Every week, Orkut published a ranking of country usage. When Brazil begun to rise up on the list, Brazilians started campaigns to invite new members to the network. They expected that if they had a big amount of users, the system could be translated into Portuguese. In protest with the long wait, some users entered English-speaking communities and posted spoof messages in Portuguese. There was a roar among Brazilians that if they changed profile nationality to United States they would not endure system instability, which was frequent at that time. At the end, Americans gave up using this social network and Google transferred its development to their Brazilian office. Nafus et al (2007) provides a more in-depth account on how Brazilians think they have "conquered" Orkut.

After this episode, the popular invasion in social networks is called "orkutization" in Brazil. Those who migrated to newer social networks like Facebook or Twitter are afraid that these networks will become filled by irrelevant content and impolite behavior in the same way. The "orkutization" meme still has some reminiscences of a cultural elitism that negates popular manifestation as part of the culture.

Gilberto Gil, as the Minister of Culture, took a pioneer approach when, still in 2003, recognized digital technology as a crucial concern for culture development. Gil celebrated the encounter and hybridism of multiple cultures in his earlier song Through the Internet (1997). Instead of reproducing the Internet surfing hype that came from abroad, the song expressed a desire to make a raft, in order to navigate together and promote an intercultural debates. He was pretty much worried on enabling making things together. One of the first actions as a Minister was to establish a partnership with Creative Commons, a United States non-profit organization that elaborates licenses for cultural production. Soon after that, he published his own music album with that license, stimulating anyone to use samples from his music tracks. He saw the emerging Digital Culture as:

> "The polarity between a conceptual, philosophical, political, and cultural
> discussion by one side, and how Brazilians peripheries - how young people -
> reacted to the Internet in this cultural dimension by the other side."
> (In: Savazoni and Cohn,p.308)

But Gil was not alone. At the same time, the National Information Technology Institute (ITI), lead by the sociologist Sérgio Amadeu, was fighting hard to substitute proprietary software for Free Software equivalents at governmental institutions. They partnered together to create a multimedia authoring kit based on Free Software to be distributed – and mandatory – at Culture Points, a network of independent cultural producers created by the Ministry of Culture. The network also articulated non-official networks like des).(centro, Metareciclagem, and Estúdio Livre who pretty much endorsed cannibalism in Digital Culture.

FIG. 3. GAMBIOCICLO, A PORTABLE DIGITAL GRAFITTI PROJECTOR BY GAMBIOLOGIA GROUP, ONE OF THE ARTISTS OF THE GAMBIÓLOGOS EXHIBITION (2010).

Free Software, Creative Commons and Collaborative Media became widespread in Brazil. The popular practice of *gambiarra* (kludging) and *jeitinho brasileiro* (how brazilians call their loose way of solving problems) were resignified in face of *hackerism* and *collaboration* from the pervading global digital culture (Boufleur, 2006). In spite of not having an overall theoretical background, *gambiarra* and *jeitinho* can be seen as profoundly apt counterparts to certain treats of hacker culture, specially the hands on approach. In 2010, the exhibition Gambiólogos attracted a lot of international attention to Brazilian artists working with *gambiarra* tactics (Figure 3). Gilberto Gil believes that Brazilians have discovered a way to live with contradictions that is terribly suited for current global economic instability:

> "Today we can see a brasilification of the world, the way of being tragic like Brazil, being happy and sad at the same time. Sad tropics of carnival happiness. This capability of living the tragic contemporary post-modern was possibly anticipated here in Brazil (...) This was mocked by early advocates of modernity for Brazil, a definitive configuration as a modern country, with a very defined national identity. Today it's not possible to negate that Brazil has born to be a universality, not a nationality."
> (In: Savazoni and Cohn, p.308)

CANNIBALISTIC INTERACTION DESIGN

Despite of being open for that, the Digital Culture movement in Brazil lacked enduring discussions and explorations on the design of the acclaimed digital media. Unfortunately, Design schools were not engaged with the movement. Although there are strong Industrial Design schools in Brazil, most of them followed the modern agenda of Bauhaus and Ülm and would not be prone to endorse the proposals of the Digital Culture movement: amateurism, shared authorship, open licenses, remix, popular culture, kludges, and so on. Inspired by European Design schools that embraced the Digital Culture, like Ivrea Institute and its successor, Copenhagen Institute for Interaction Design (CIID), a multidisciplinary group founded Faber-Ludens Institute for Interaction Design in Curitiba, in 2007. Run without any institutional funding at the first year, activities were primarily held on the Internet, where a website and a discussion list was opened. Members of the discussion list organized themselves to translate basic texts on Interaction design because most Brazilians don't read English. A wiki was born out of that, including later information about methods, tools, books and movies that members wanted to share.

In partnership with a Colombian University, Faculdades San Martín, and a Brazilian University, Universidade do Contestado, Faber-Ludens begun offering a graduate course on Interaction Design. The curriculum was structured to offer a strong social background, emphasizing Interaction Design role in culture production. Each theoretical course was accompanied by an experimental design project. All assignments required students to publish their works on Faber-Ludens website, where non-students community members could comment. The same with teaching materials.

Non-student members reported learning by following published projects. Although projects were published under a Creative Commons License, some ideas were copied without giving any credit. Instead of trying to regulate that cannibal practice, Faber-Ludens stimulated even more its students to publish their projects, document the design process step-by-step, and build on top of ideas from other students. Faber-Ludens had the hard task of pioneering Interaction Design in Brazil, so its founders believed that spreading the practice was more important than being credited.

Since the beginning, Free Software communities inspired Faber-Ludens founders, but they lacked an integrated vision and theoretical systematization, which was later found on the work of Vassão (2008).

THE METADESIGN CHALLENGE

During his doctoral work, the architect Caio Vassão (now part of Faber-Ludens hall of teachers and researchers) developed a concise and precise theory to Open Innovation, which he called Arquitetura Livre. It's loosely based on Free Software Movement's approach, explaining and expanding them through post-structuralist philosophy. It deconstructed Metadesign, an abstraction mechanism that is responsible for the formalization of

many aspects of our urban life (Van Onck, 1963; Virilio, 1996), to reveal that, at a certain level, formalization turn into a banal thing and a new cycle of unpredictable and innovative appropriation follows (Vassão, 2008).

Vassão was worried that Metadesign could turn into a totalitarian approach for behavior control. Arquitetura Livre was meant to provide an ethical background for designers interested in dealing with Metadesign issues. Inspired by Merleau-Ponty's Phenomenology (1996) and Deleuze's and Guattari's Nomadology (1995), Vassão proposed that the body should be considered the fulcrum in which every creative considerations should hinge upon. Given that knowledge is precarious and faulty, our most profound frame of reference is the direct, first-hand, bodily experience. In other words, a hands-on approach is the most powerful and legitimate form of design (Vassão, 2007, 2006, 2009).

From this embodied perspective, cannibalism is not anymore a metaphor, but a real possibility of extending design skills. Lynn Margulis' works on the evolution of primitive life-forms suggests that one possibility for early life to become more complex is through "eating without digesting": a simple being would try to eat another being, and, in some cases, it would not digest its prey - they would became symbiotically intertwined (IUPUI, 2002). In the same way, people can use technology as an instrument to control the environment, and be subject of alientation, as Frankfurt School denounced, or they can embody themselves into technology, becoming one with their tools, effectively creating a new more complex body (Vassão, 2008, 2010). The creation of new bodies, thus, can only be understood from a poetic perspective.

Vassão proposed such perspective to Interaction Design in order to legitimate the artistic experimentation of new ideas, products and services. It contrasts the rational design and evaluate program of Human Computer Interaction (HCI), which is still influential in Interaction Design. HCI developed a body of knowledge on the relationship between users and computers, but it says little on how to make technology appealing enough that people would want to make part of their own bodies. Despite of its shortcomings, HCI has been largely appropriated by Interaction Design, and vice-e-versa - often without acknowledging each other, a classical case of cannibalism between disciplines.

An example of this cannibalism is the birth of the Graphic User Interface (GUI). The GUI has been developed during the 1970's at PARC, a laboratory that applied HCI theory to develop new products for Xerox company. The company didn't perceived the value of the GUI technology, so it allowed Apple Computers to visit PARC and see what was going on there. Steve Jobs, CEO of Apple at that time, saw a great opportunity on using GUI to enable the appropriation of computer power by ordinary people and, after visiting PARC, started a project of a personal computer based on a GUI called Liza. Due to internal political changes at Apple, Steve Jobs lost his position as a CEO of Apple and also control over the Liza project, which he thought it was going in a wrong direction. In a radical attitude, he started another personal computer project at Apple, which was later

known as Macintosh. The Macintosh team digested ideas both from PARC and Liza and ended up delivering a better product than their predecessors. The Macintosh was based on voracious cannibalistic practices, which continued after the product's launch with all the new appropriations that personal computers were subject to in their users hands. Until today, Apple consumers expect very anxious for new products to amplify their bodies.

DESIGN LIVRE

Despite of offering easy to use interfaces, Apple products don't offer too much customization possibilities for their users. Both hardware and software are locked in for incisive appropriations. Advancements are all developed under secrecy and patented as soon as possible. At the other hand, Apple opened their application distribution system to basically anyone who wants to distribute a piece of software, sharing the profit in a very transparent way. Also, Apple effectively develops more than 200 Open Source projects with its developer community. Many commentators have described Apple as an ecosystem of multiple smoothly interconnected developers, consumers, applications and data. In fact, it has grown enormously by choosing wisely where to open and where to close for interferences from the environment.

Although Apple sell products to the whole world, it's firmly rooted on the Silicon Valley, with has a culture of it's own, even in the United States. All of its admired products have only been possible because this company articulated so well in that culture. Any attempt of reproducing this model in a different culture would risk failing terribly. Irrespective of being constantly used as an example of good Interaction Design by interaction designers, the Apple model could only be useful to Brazilians after a good digestion.

Design Livre is Faber-Ludens attempt to rethink Interaction Design from a Brazilian culture perspective. It's not a theory, nor a practice. It's praxis: a set of attitudes that are consistently taken by people in their activities. The Design Livre book (2012), written by Faber-Ludens community, identified some patterns in reference projects in Brazil an abroad: Do-It-Yourself, mass customization, user participation, local production, sharing source-codes, gambiarra, self-maintenance, accessible documentation and conscious consumption. These patterns are not a set of requirements for Design Livre to happen, but a snapshot of current related trends. Amstel (2012) summarizes it in a set of three attitudes: being critical about the status quo, developing autonomy, and dreaming with a better world.

The name is kept in Portuguese for historical reasons. "Livre" could be translated into English as "free", but this word has double meaning: the quality of freedom and no cost. If we called it Free Design, we would risk having the same problem that Free Software had before: being understood as cheap. If we adopted one of the Open Design definitions (Abel et al, 2011), we would end up leaving out the ethical debate that the Open Source term skipped (Stallman, 2009), and hide up the cultural context where it emerged. It's important to mention that the "design" word has been first translated as "desenho" by Bra-

zilian Industrial Design Schools, in consonance with the modernization of the national identity during the 1960's and 1970's. Because the first mean of "desenho" in the popular vocabulary is the same as "drawing", and professional designers wanted to emphasize that they do more than drawing, the word "design" became gradually more used, to the point of being officially adopted by the professional regulation of 2012. Design Livre, thus, is a hybrid that brings back the digested "design" word from Brazil.

Aiming to support Design Livre projects in other organizations, Faber-Ludens Institute created Corais Platform[1], a web application based on Free Software that offers free infra-structure for anyone that wants to conduct a public collaborative project. When Corais was launched in 2011, there were already good web applications for collaborative work, like Google Docs and Basecamp, but they kept important design knowledge closed inside login routines. They weren't adequate when the project expected collaboration of unex-pected voluntaries, like in GitHub, a programming code repository. Instead of sharing programming code, the proposal of Corais was to share the design code. This simple shift lead to a not yet finished debate: what is the code of design? If design is not the drawing itself, it shouldn't be the Photoshop file either. The Open Design proposal of sharing 3D files wouldn't be enough, although that was an important part of it. Without knowing the rationale for the designed result, it would be hard to continue the design process. That is also an issue for Free Software, as many projects lack proper documentation, but is even harder for Design Livre because there are no standards for documenting design code.

Instead of defining such standards and imposing them on projects - something that would be hardly effective, Corais captures the design rationale during communication between participants, an idea that has been used extensively in design research to analyze how de-signers think (Schön 1987, for instance) and to help groups deal with wicked problems (Rittel, 2010). When participants discuss a product's storyboard (Figure 4), they share comments and images, which are recorded in a chronological history of the project. Eve-rything that is generated through this collaborative process is accessible not only by project participants, but by any website visitor. An user of a product designed in Corais could come there and learn about it enough to transform it in another thing.

In the long run, researchers could study the sum of captured design rationale like linguists work with language corpora and contribute to understanding the nature of design codes. Corais already has a space where this knowledge can be shared: a wiki with general de-scriptions of design knowledge. Currently there are five categories: Design Documenta-tion, Design Tools, Design Games, Design Methods, Design Techniques. This wiki can be connected to the project environment when a participant mentions explicitly a = described knowledge in the discussion. The participant can go to the general description,

[1] "Corais" stands for "coral reefs" in Portuguese. is based on the distribution Open Atrium of the Drupal Content Ma-nagement System. Accessible at http://www.corais.org.

learn something new, come back to the project, and apply it immediately. Another possibility is to start from the general description and see all the linked projects, giving a rich set of examples of the knowledge in action. Currently, there are dozens of wiki pages on methods for including users that would not be interested or knowledgeable enough to partecipate in Corais by themselves, like Focus Groups, Usability Testing, Future Workshops, and Ethnographic Study.

FIG. 4. DISCUSSING THE EXPERIENCE OF A CARD GAME THROUGH COMIC STYLE STORYBOARD IN CORAIS PLATFORM (2011).

Corais is developed with the intention of facilitating learning design while doing. Participants have the opportunity to design their own design process by combining the design knowledge shared by other projects with the collaborative tools available. Members learn not only how to design, but, most important, how to design a design process, the Metadesign studied by Vassão (2008). When a project stops by any reason, it still contributes to future projects by leaving the traces under the specific design structure created for that project. Because all the content is licensed by Creative Commons, cannibalizing structures is not prohibited. Like in real coral reefs, the structure is alive, changing all the time, but when it dies, its skeleton is used as a base for new beings. A structure that serves many entities becomes stronger and stronger. Corais can be conceived as an ecosystem that adopts an evolutionary development process, where collaboration – and not competition – selects the best structure available.

CONCLUSION

The cannibalism metaphor has been used to interpret Brazilian cultures in important historical moments, proving to be a fruitful concept to understand and produce cultural hybridism. If ideas and technologies can be considered parts of the human body - as cyborg experiments suggests, then cannibalism is not any longer a metaphor, but a real phenomena. When ideas and technologies are part of human bodies, they become alive and develop further. If they are not used, they die.

Design Livre proposes that cannibalism should be encouraged - instead of prohibited - in design practice and education, in an attempt to give an after-life for projects. When practiced with the same honor that Brazilian aboriginal dedicated to their eaten enemies, cannibalism can foster collaborative environments, where everyone profits from working together. It legitimates copy and plagiarism, which were so important for recent innovations in arts and technology development (Critical Art Essemble, 1994).

As we create this post-humanist reality, we should keep in mind that "we stand in the shoulder of giants", as Linus Torvalds once explained the success of the Linux Free Software Operating System, a phrase repeated by many other important figures across the last millennium, each in a different cultural situations, each with a different meaning, but all of them with the same appreciation for the Other.

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NOTES ON THE VISUAL LANGUAGE FOR THE COMMUNICATION DESIGN

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Over the last years, at the Laboratories of Graphics of the Industrial Design Degree Course of the Faculty of Architecture of Genoa, we have dealt with the issue related to the possibility of using different visual languages for the projects of communication design, putting together the contents and experiments of the Laboratories of Project of the same courses. In this way, the field of "drawing" ⁄ or, more correctly, "representation" ⁄ and that of "industrial design" coexist and interface, everyone with its peculiarities, producing remarkable outcomes, both in terms of didactics and in terms of applied and methodological research. The conditions arise from the necessity to teach the students (future professionals and designers) not only the mastery of techniques and main theoretical and practical knowledge, but also – or, above all ⁄ the capacity to reason about the possible expressions related to the issues of communication, in order to be able to choose what best meets the main purpose of communication, so as to avoid misunderstandings, errors and, at the same time, attract the attention of the viewer. Like in the verbal and written communication, to every purpose there is an appropriate choice: the spoken language, prose, poetry, sms and e⁄mail messages, are some examples to understand how we can transmit the same idea in different ways and how delicate is the choice the author must make, taking into account the interlocutor to whom we are addressing.

At the base of these considerations, that are the frameworks of the Laboratories of Graphics, there is a long research, which begins from the hypothesis of an analogy between the verbal and written communication and the visual one. In addition, the proposed method of study also carefully considers the highly visual value of writing, very well expressed by the wide range of typefaces in use, as well as the text value of the image, similarly expressed by the advertisements which tell only by *visual*.

Word, drawing, sign, but also communication and representation and it is not by chance that they are the title of the two main publications which point out the above mentioned contents: the work "Parola ⁄ disegno ⁄ segno" ("Word ⁄ drawing⁄ sign"), published in 2006, contains some examples of the notion of "targeted" language and of the value of the

iconic visual language as potentially universal, to be opposed to the symbolic language, of which one concerns the symbols of Mathematics. "Comunicazione e rappresentazione" ("Communication and representation"), instead, identifies the main elements of the project of communication and the interrelations that exist between those elements, underlining, as a consequence, the importance of the choices, too often hastily made, if not too automatic (for instance, the choice of the font, rather than that of *visual*).

Well then, it is about reasoning on the conflicting values of the parts that constitute the message, as for their consolidated employment: the text, then, becomes the prevailing meaning of the image and the image becomes the narration.

And you can find nothing more experienced, in hindsight; just think of the design areas of the illustrations obtained with the letters and on the contrary of the tale that is the subject of the posters.

FIG. 1. FOUR HISTORICAL POSTERS WITH THE SAME SUBJECT (AN ALCOHOLIC DRINK) AND THE SAME MESSAGE (DYNAMISM AND VITALITY), RESOLVED THROUGH THE ONLY USE OF THE IMAGE, WITH DIFFERENT GRAPHICAL LANGUAGES DEPENDING ON THE TIME AND CULTURAL REFERENCES IN PLACE.

In both cases it is about defining and emphasizing the importance that, as a rule, does not belong to that type of graphic component. Indeed a more precise definition of "manifesto" or poster is precisely that of " static cinema", indicating the narrative role of what is represented, not necessarily accompanied by the text, as shown by some examples, also well known, that may help to clarify the concept, both in the case of "historic" advertising and in contemporary one. The text part, therefore, in such situations, is not conclusive and may not even be present, except in the name of the manufacturer and/or of the product. By way of example only, it is useful to present here four "historic" posters and a contemporary one, with opposite characteristics, the formers "talking" through images, the latter "displaying" text only.

The mentioned posters show, as topical, an alcoholic drink and the message to be transmitted is the joyful, vibrant motion and the dynamism that the intake of the drink brings to the drinker, so the visual language used is consequent to the initial choices and everything is based on the proposed product, surrounded by a context fully correlated with the historical-cultural moment of the graphic design. In chronological order, the manifesto of the Isolabella has a dancing Harlequin, surrounded by bottles that follow its movement and everything is designed in a realistic manner, including the bottles, perfectly recognizable as for their content, form and label. Advertisement for Martini, instead, is based on a representation of a schematic and symbolic human figure, projected up and dragged out of the bottle (still more realistically drawn to make the product recognizable) and the movement is given by the many kinetic lines - typical of the comics-language - that follow the body. Beer Bosio Caratsch is the protagonist at the center of the composition, foaming in a full glass and dynamism is suggested by wavy lines, made of warm colors, from yellow to orange. For the manifest of the Bitter Campari finally Depero creates a total instability of forms that makes the scene dynamic and geometrizes both the human figure and the objects in the scene, to a complete abstraction.

FIG. 2. A CONTEMPORARY POSTER, IN WHICH EVERYTHING IS PLAYED ON THE VALUE OF THE TEXT AS IMAGE AND, THEREFORE, THE SOLUTION OF AN ATTRACTIVE LAYOUT.

Definitevely, in the products given as examples, which spread the brand of different beverages, each choice of color, typeface, design is functional to the final render of the message that, although unique, is expressed in a manner each time different, depending on the author, on the historical moment, and, above all, on the time necessary to the understanding of the observer: the closer you get to the contemporary, in fact, the greater the need for immediateness and simplification, so that the viewer can understand the whole message as fast as possible... and still the demand for greatly reduced attention spans underlies many representative choices.

On the contrary, the case of communication "text only" poses a substantial problem of layout and the solutuion is all played on the position of the text; in the notification submitted for the Mercedes brand cars, the position of the writings on the page layout brings throughout the viewer's attention on the slogan, "How can I explain it to you?" version derived from the stereotype "I have no words" related to extraordinary events. It is clearly evident how in a panorama of visual posters, a textual space emerges and strikes the viewer, perhaps more than many images.

FIG. 3. PICTOGRAMS AND COLORS TO SUPPORT THE READER'S UNDERSTANDING: THE DIVISION INTO TRAILS, CRITICAL NOTES AND PARTITION SECTIONS OF THE *GUIDA AI PALAZZI DEI ROLLI* (*GUIDE TO THE ROLLI PALACES*), EDITED BY A. PARODI, ALGRAPHY, GENOA 2007.

Always, however, in setting the layout, the perceptive value of the text will play a key role in the design choices, becoming part of the evaluation of optical weight, of the position and the resulting use, optimal to understand the product and the design, and will take into account all the elements of representation, drawn or written.

In this sense, an useful exercise for the acquisition of skills and verification of effectiveness is to recognize the layout of a given graphic composition, as well as the proportions, the colors and all conditions related to the definition of the product. In particular, as for the editorial product, it will be essential to recognize the three main types of the text, the image and the graphic sign, where the last term refers to all the wealth of visual choices that

guide the reader to the correct use of the product itself. Graphic sign, therefore, will be the location of the page number, the "threads" that divide the spaces, color boxes, and so on. The color, in particular, represents an extremely useful element in specifying the forms and meanings; for example, you can simply think about the definition of a "thriller" as a "giallo (yellow)", originally linked to the specific colour of the covers of thrilling stories that Mondadori published. "Giallo" later became the common substantivated adjective that indicates the similar literary production, regardless of the publisher or, again, of the division distinguishing chromatic parts of an editorial product (headings, chapters, sectors, files, etc.).

In addition, the color can be examined in its double function of denotative and connotative element in both the "natural", and "artificial"environment, belonging, therefore, both to the instinctive communication, and to the design, as can be easily seen from the examination, even superficial of what surrounds us.
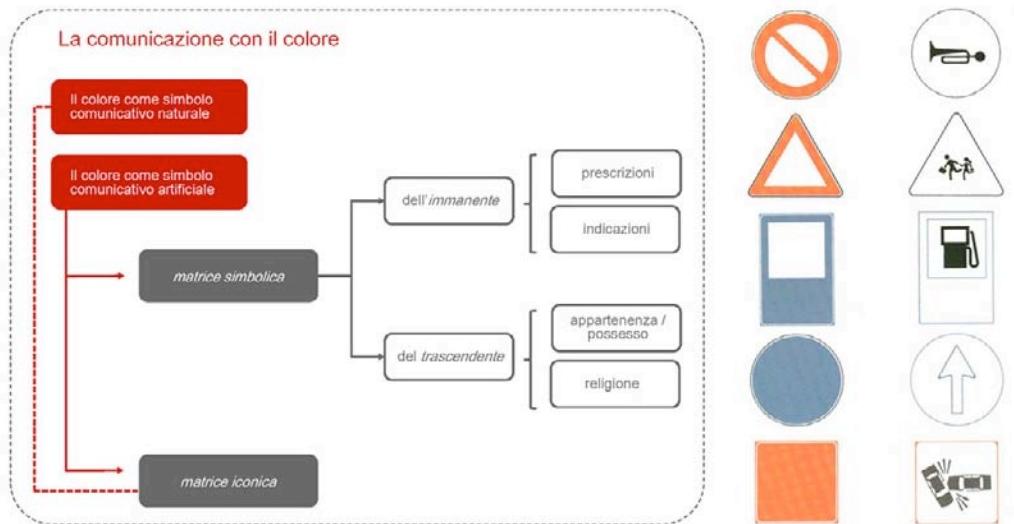
FIG. 4. SCHEMATISATION OF THE POSSIBLE CRITICAL READING OF THE USE OF CHROMATISMS AS ELEMENTS OF VISUAL COMMUNICATION. FIG. 5: THE EXAMPLE OF A VISUAL PROJECT WHERE ICONIC AND SYMBOLIC ELEMENTS CO-EXIST:: THE ROAD CODE.

The whole animal world tells, through the phenomena of mimicry, for example, the chromatic function of defense, with the mantle that changes depending on the environment (whitening in the presence of snow, rather than assuming the same chromatism of vegetation), but also the animal-man shares the same experience (it turns red with anger, shyness, it pales out of fear and so on).

This can certainly be defined as communication, not intentional, of course, but not, for this reason, less significant and clear. Even the color of the skin transmits informations and

tells of the originary countries with different climates, involving different habits and needs of survival.

The color, ultimately, may connote an identity already in an unwanted way, without any intervention by man.

The natural experience, of course, can then be translated into terms of design and, therefore, from the communication in which the color is understood as a natural communication you can switch to color as an artificial communication.

In this case, of course, the facets become larger and encompass numerous adjustment possibilities, among which you must at least identify some main differences, functional to the design communication project.

First, the first main distinction is the separation between the chromatic communication with symbolic matrix and the communication with iconic matrix.

Icon and symbol are the two terms of the eternal duality of representation, which draws its essence from the possibility of the imitating what surrounds us in a way as similar as possible to the real reference or, conversely, from the possibility to intervene with the project will and to break down, demolish, change the reality into the "other".

In the first case potentially anyone can understand and do what is just represented, in this second case, however, you must clearly establish a code of interpretation, which allows the viewer the correct reading of what is expressed.

Merely as an example, see the two main areas of territorial maps, which can be iconic (with the realistic color of the mountains, waterways, crops) or symbolic (the whole area of thematic maps, plans, where the color is symbolically given and corresponds to areas, sectors, for whose correct interpretation and understanding ia detailed legend is needed).

But a further specification is needed to make us understand how in the chromatism of symbolic matrix at least two possible purposes may still exist: that is the communication through the color of what could be described as "transcendent" and communication through the color of what could be described as "immanent."

Everyday world for both sectors, but deep, substantial diversity of purposes.

If we analyze the term "transcendent", you can imagine how the applicability of this award is specifically aimed at "what's beyond"; the first meaning of the word indicates *that exceeds the limits of sensory experience, which falls outside of objective reality*.

What the project area, then? Without any doubt the sphere of religion, but also that of the outward signs that acquire specific meanings: the sacred vestments, whose colors indicate periods of specific celebrations (penance, joy, expectation), the clothes "dedicated" (to the mourning, the wedding), but also the colors of the face or body parts to expose the condition of the person (girl or wife, child or warrior, community leader or spiritual leader).

All can easily be read in the traditions of the past, but that may perhaps still be traced, if these previous meanings can get a wider translation of "membership" or "possession."

In short, the communication through the chromatisms of symbolic matrix of colors, that

belong to the area of the transcendent, concerns, broadly defined, the informations related to the sphere of religion and those related to being "part of ..." or "belonging to ... "

In contrast, the communication through the chromatisms of symbolic matrix that belong to the sphere of the objective reality around us, that may generically defined as "immanent", concerns, broadly defined, the whole area of requirements and guidelines, which are nothing but the same contents set out above, this time objectified in their practical applicability.

Therefore, you can get the red color attributed to the concept of danger or prohibition, the green given to the environment and ⁄by extension⁄ to rest and free way, blue or light blue attributed to what regards water.

Colors such as effective and unambiguous communication, then? Important design tools, applicable equally to different cultural and geographical contexts?

Certainly not, of course, since of the concept of variability and relativity is already implicit in the terms "code" and "symbol"; to go on with the previous examples, the colors linked to the rite celebrations will depend on the religion professed, as well as the chromatisms assigned to feelings (purity, grief...) will depend on the areas of cultural reference.

And the same may happen for the artificial communication of "immanent" with a symbolic matrix, conveyed through colors that ⁄by definition⁄ are arbitrary, albeit with the possibility of being generally derived from distant "natural" references, as previously seen.

A case study, particularly interesting in terms of representation, which at the same time is based on icons and symbols, is the one given by the rules of the road code (Fig. 5). In this realization, in fact, while it has been kept in mind to explain to the highest number of people the meaning of the different signs, so as to give their widest diffusion even among those who have not had the opportunity to learn the adopted visual code, on the other hand it has been necessary to dispense prescriptions and provide informations through the use of forms that had received a studied and specific meaning.

Thus, in addition to the images hosted in the signals of obvious iconic matrix, whose representation can be traced back to the schematisation and stereotyped representation of forms, still perfectly recognizable as for the reference model, you can find geometric themes, such as those of the circle, the triangle and square, with different meanings depending on the assumed color.

Red, blue or black signals of various forms must read as a prohibition, danger, indication and this level of understanding is now so widespread to be borrowed also in other areas, such as that of the instructions for use.

In this regard, for example, suffice it to consider the case of toys, with, on the pack, the red circle with cross slash and the inner icon of the face of a child to show, to indicate, without any words, the prohibition of use of the product below a certain age, according to a language clearly borrowed from the Highway Code, in fact.

As regards the project applicability of what above explained, then, it is at least, mandatory to remember that the first essential criterion to follow is that of the certainty of a good read⁄

ability of the visual communication: typoghraphic characters and background, chromatism and textures, images embedded in chromatic contexts and related to inscriptions must ensure a good level of contrast between light and dark tones, to give effect to the perception of the finished product.

In addition, we must also mention the problem of accessibility, that is of the enjoyment by all of the informations provided, which is gradually reduced as the contrast between the figure (either text or image) and background reduces.

This is the reason of the many monochromatic choices of signs (black and white, gray and white, blue and white), almost a non-color, but not as a renunciation, but as a choice motivated for reasons of optimization of the visual message.

These short, initial considerations are sufficient to understand how the correct approach to the design of communication can not be separated from the knowledge, from the application and testing of what belongs to the representative field, regardless of whether it is a discipline of knowledge foundations, to be opposed to the more precisely practical implementations and in some cases, even the representation itself will become the project, without any need for further transcription.

It is what happens, obviously, in the image projects for descriptive, informative or prescriptive purposes; in such situations, in fact, the moment of differentiation between the drawn representative field and the design and technical field will be the one of the true realization and, consequently, the moment of the choice of materials, media, techniques of execution. The design of a brand, but even more the design of pictograms or icons (with varying aims) are moments of graphic synthesis in which the competence and the experience of representation play a very important role.

The explicit inevitable reference is therefore to the close cooperation that spreads between the field of representation and the field of design in the project of products similar to those mentioned above. This cooperation can also foresee some superimposions of competences and exchanges of experiences, so that the "communication design" is often borderline with respect to the two sectors, depending on whether the aspect of perception and visual communication or the aspect of the design of the subject and the impact of the choice of materials is prevailing.

Suffice it to think, just as a case in point, to the synthetic signs representing people, animals, physical and behavioral situations so well expressed in the various codes, from that of the road; the long mental process of abstraction, synthesis and reduction of the signs leads to the contemporary return of a graphic image that does not need of any more means to become a realizable project but only of the support that will host it to insert it into the context for which it was designed.

And, on the other hand, it is what happens in painting and visual art forms in general: the idea is clear and is projectually defined in the same moment in which the author considers it ended: design and implementation of a communication, immaterial in some respects,

but a project no less real and concluded than that relating to a building.

The languages, of course, will be plural and relevant to the purposes to be achieved: free-hand drawing, technical or assisted, photography, photo editing and photo montages, but also texture and patterns, colors and graphics. In short, all the visual system achievements that can be used to communicate (even the mere sensation or a feeling) and guide the perception of the user to the correct (according to the intents of the designer) interpetration.

The signs, in this sense, are a case in point for complexity and quest for efficiency; it is, in fact, about identifying shapes and signs that are the most immediate and simple as possible, as well as universally recognizable as possible. It's not just only about road signs, although the reference to these is the most immediate and perhaps the more correct, considering its spread and its transversality as a model, but also to tourist signs, orientation in urban and built spaces, the explanation and information of data and so on. And the project always involves a careful study of the forms of signs, signs and colors to be presented; in short it involves the study of what will be represented: the project is the proposed representation, together with the study of materials for the construction and forms of the supports that will host it.

Another highly significant case, and in many ways often ambiguous, is the case of the mark, that is the connotative sign of an identity, regardless of the nature of that identity: to design a brand, in fact, means designing a visual sign of fiction, no matter if encoded or realistic to represent something to communicate something; once again, the representation is here a concluded project, which does not require any other step to the realization, if not the choice of support and surrounding conditions, for which it is drawn up a specific "Manual of the requirements." The ambiguity lies in the fact that despite what has been shown, the design of the brand is defined as a design project and the competence of representation becomes only a technical and executive corollary.

In reality, on the contrary, in any communication -as discussed above- in which the representation is a primary element, you can find as projectual components illustrative design skills, ability to synthesize graphically, mastery of chromatic choices, and these are skills that are acquired through the practice of the disciplines of the representation ... which means finding a strong cooperation between the aspects of the project and those of the so-called "technique" to make it happen.

Living together skills, where boundaries and spheres of mutual interest should be clear in order to avoid overlapping and interference or, on the contrary, amomg which the boundary should be quite labile; in some cases to establish a clear and precise boundary between what is technical and what is the created content is neither simple nor immediate, when the content coincides with the application of the technique.

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Studenti: C. Bracco, S. Mosconi, F. Martello, I. Facci, N. Gotelli.

Studenti: L. Sandalo, C. Tauia, G. Mantero.

Studenti: F. Anderlini, S.Giunta, N. Beccuti, E. Colombo, E. Bassani, S. Brondolo, S. Barbieri, A. Vale, S. Bosio, D. Dellacasa, V. Magliano, A. Menconi, I. Parodi, G. Ranieri.

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FIG.6. COMMUNICATION AND DESIGN PROJECTS FOR "LA CITTÀ DEI BAMBINI", GENOA, CARRIED OUT IN THE DEGREE COURSE IN INDUSTRIAL DESIGN AT THE FACULTY OF ARCHITECTURE OF GENOA.

FIG. 7. COMMUNICATION AND DESIGN PROJECTS FOR THE REHABILITATION AND COMMUNICATION FOR TOURISM IN THE AREA OF SAN VINCENZO IN GENOA, CARRIED OUT IN THE DEGREE COURSE IN INDUSTRIAL DESIGN AT THE FACULTY OF ARCHITECTURE OF GENOA.

FIG. 8. COMMUNICATION AND DESIGN PROJECTS FOR THE "GRUPPO BANCA CARIGE" CARRIED OUT IN THE DEGREE COURSE IN INDUSTRIAL DESIGN AT THE FACULTY OF ARCHITECTURE OF GENOA.

Some experiences in the area of Genoa have made it clear that an effective and organic interrelation is possible, respecting mutual skills and peculiarities, between the world of design and that of representation, as it is well specified during the works on a hypothesis of exploitation and recovery for touristic-cultural aims of historical emergencies, then pub-

lished in "The Imperiese coastal towers ", in which the terms "design" and "communica‑tion" found a clear definition in the proposed design of a visual identity based primarily on the representative and visual values of the elements, or even in the previous experiences in applied research which became the subject of specific agreements: among the main ones the study to identify new ways of interrelation between the user and ATM locations of bank branches of the "Gruppo Banca Carige", the numerous initiatives undertaken over the years with La Città dei Bambini, the hypothesis of regeneration and recovery of the Genoese urban area around Via San Vincenzo, the proposals for design and communica‑tion for the Attese Bienniale of Ceramics in Contemporary Art.

In particular, one of the most emblematic cases in terms of perception and visual com‑munication is precisely that given by the representation of schematic forms to support the use or understanding of the user, such as in editorial design; graphic elements, such as fillets or texture, often accompany pictograms and icons to identify sections, critical notes, contributions, as well as they cooperate in the visual establishment of tourist guides, cata‑logues, lists. And, above all, they constitute the essential apparatus of "instructions" for use, which, if properly designed, become non‑textual information.

A wide and coordinated way of working, therefore, where the skills of visual communica‑tion are organically related to the choices of materials, the design of forms, so as to obtain a result truly achieved in the awareness of the choices we made.

These brief notes are based on experiences of research and teaching, exposed in the volumes mentioned in the opening (which can be referred to for an essential bibliography), but also on University and Ministerial research projects, Conference experiences, mutual exchanges of informations and thesis, such as Conferences on Colors, organized by the Gruppo del Colore, the annual meetings sponsored by theUnione Italiana Disegno, meetings held at the Politecnico di Milano, Faculty of Design, the relationships between design and repre‑sentation disciplines, as well as collaborations with magazines such as Disegnare and GUD.

STRAND 4
THE SCHOOL TALKS ABOUT ITSELF

DEFINITION OF A MULTICRITERIA SYSTEM FOR THE EVALUATION OF THE SUSTAINABILITY OF FOOD PACKAGING

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The research carried out is aimed at developing an assessment method useful for the sustainability evaluation of food packaging. Food packaging could be considered a key element, because it can be the way by which to communicate and increase the "sustainability of food", raise the awareness of consumers and promote the traditional value of regional products. Conversely food packaging is one of the most responsible for the waste generation.
On these assumptions, the research has been started from an analysis of three case studies: chocolate products, alcoholic beverages and meats, representative of the traditional agri-food production chain of the Piedmont Region.
By the analysis of these case studies, a multi-criteria evaluation system has been conceived on the basis of the fulfilment of environmental, functional and communicative requirements, which have to be satisfied by food packaging along its life cycle in order to be sustainable.
The paper illustrates the methodological approach that has been adopted for defining this assessment method in the specific case study of chocolate.

••• Food packaging, environmental life cycle performances, evaluation system and method, packaging end-of-life treatments, chocolate •••

INTRODUCTION
The paper originates from the multidisciplinary research Poliedro (Pollenzo Index Environmental and Economics), which is funded by the Piedmont region (Bando di Scienze Umane e Sociali) and involves several research units from different institutions.

Specifically the Poliedro purpose is developing an evaluation system for agri-food products, capable of summarising the principle of good, clean and fair and therefore able of considering at the same level, the environmental, social and quality variables that influence the performances of the agri-food product throughout its entire life cycle. An evaluation system that on the one side is adopted by local producers in the production chain to assess the level of sustainability of their products and on the other is a guide for the consumer in the choice of agri-food product that is more sustainable.

Within this project, the Research Unit of Industrial Design DIPRADI (Department of Architecture and Industrial Design, Politecnico di Torino) is involved, with the aim of outlining a methodology for assessing the sustainability level of the food packaging which must be integrated into the wider evaluation system of the agri-food products defined by the Poliedro project.

In order to be considered sustainable, food packaging must be evaluated while taking into consideration the functional, environmental and communication requirements that it must satisfy throughout its entire life cycle. Environmental requirements that refer to the consumption of resources and energy and the generation of waste and emissions into the environment. Functional requirements that refer to the need to use packaging correctly, and finally communicative requirements that recall the need to recognise and identify the content.

On these assumptions, the research starts with the analysis of three case studies: chocolate, alcoholic beverages, meat, representative of the principal agri-food chains in the Piedmont region, in order to identify the evaluation criteria on which to base the weighting system of the packaging.

The evaluation approach adopted is based on two different levels of analysis, the first, quantitative, through the use of environmental indicators such as the Carbon Footprint and Embodied Energy that are generally used in an analysis of LCA (Life Cycle Assessment), the second, qualitative, referring to the degree of fulfilment of the various functional, environmental and communicative requirements that the packaging must satisfy.

FOOD PACKAGING SCENARIO

Before explaining the specific chocolate case study, which is the subject of this paper, the research has analysed the main criticism relating to the food packaging, often identified in the need to increase the recyclability potential of the constituent materials, which quickly turn into waste, due to the short duration of the life cycle of the packaging itself.

This criticism is addressed in the EU Directives 94/62/EC - 2004/12/EE and has led to the creation of national consortia for the management of packaging wastes, but have not yet yielded the expected results. At European level, while on one hand the percentages of recycling of packaging materials are increasing, underlining the efficiency of consortia dedicated to this purpose, conversely, the continuous increase of per capita production of

packaging waste highlights how good prevention practices are not yet consolidated[1]. Eco-design strategies aimed at improving the environmental footprint and LCA analyses that highlight the principal environmental problems of food packaging have already been studied by other researches, but rarely have these studies focused on the existing relationships between the food production and packaging chains and on a multi-criteria evaluation of packaging performances, which is based on qualitative and quantitative criteria (De Monte et al 2005).

Consequently, by adopting a life cycle approach, the research started by comparing the relationships between the life cycle of the agri-food product and the packaging (Fig. 1), which show, above all, how the packaging itself becomes an ingredient of the food during the food production phase. Furthermore it is also noted that while the phases of production, packaging, transport, purchase and consumption of the product can be directly controlled by the agri-food producer, the other pre-production and end-of-life phases are the responsibility of others players, who are involved in the life cycle.

Based on these considerations, the methodological approach adopted in the research starts with the analysis of the requirements associated with the contained food and the classification of the different types of packaging available on the market. The requirements definition firstly was focused on identifying the requirements that must be met during the stages of the life cycle directly controlled by the agri-food producer and, secondary, was extended to include the requirements that must be also satisfied in the other phases not directly controlled by the food producer, in order to take into account the reduction the overall impacts of the entire life cycle of food packaging.
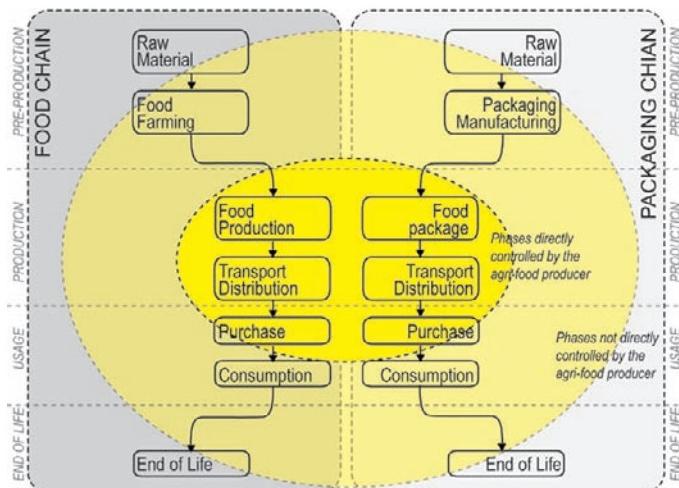
FIG. 1. AGRI-FOOD AND PACKAGING CHAINS: LIFE-CYCLE COMPARISON.

[1] http://www.eea.europa.eu/data-and-maps/indicators/generation-and-recycling-of-packaging-waste/generation-and-recycling-of-packaging-2. (accessed 10/03/2011).

THE CHOCOLATE CASE STUDY

Based on the considerations taken, the chocolate case study has been the first experimentation field, under which they have identified a first series of requirements-evaluation criteria on which to set the evaluation index of the packaging, actually under development. In other words, the chocolate case study has been the basis on which to outline the meta-project of a first evaluation system of the packaging, to be then adopted, subject to appropriate modifications and adjustments, to other agri-food products.

CHOCOLATE PRODUCT ANALYSIS

According to this goal, the study started with the scenario analysis of different types of packaging currently used for the chocolate product and available on the market such as chocolates, chocolate bars and creams. It is important to underline that the classification was not made on the basis of the composition of matter or form of packaging because this approach would lead to a focus on the packaging only and not on the combination of food and packaging.

Subsequently, a sample of 25 chocolate samples pertaining to three different classifications was identified (Fig. 2), which does not aim to be representative of the current market situation, but was selected according to the logic of highlighting the different types of possible packaging within the same category. In addition, the selection of the representative sample was made by comparing the products from a local medium-sized production plant, Venchi chocolate (which made itself available as a case study within the Poliedro project) with other products easily available on the market.

FIG. 2. SAMPLE OF 25 DIFFERENT PACKAGING OF CHOCOLATE PRODUCTS.

Each product included in the sample was then investigated on the basis of a common form of analysis structured on a series of functional, environmental and communicative requirements (Fig. 3).
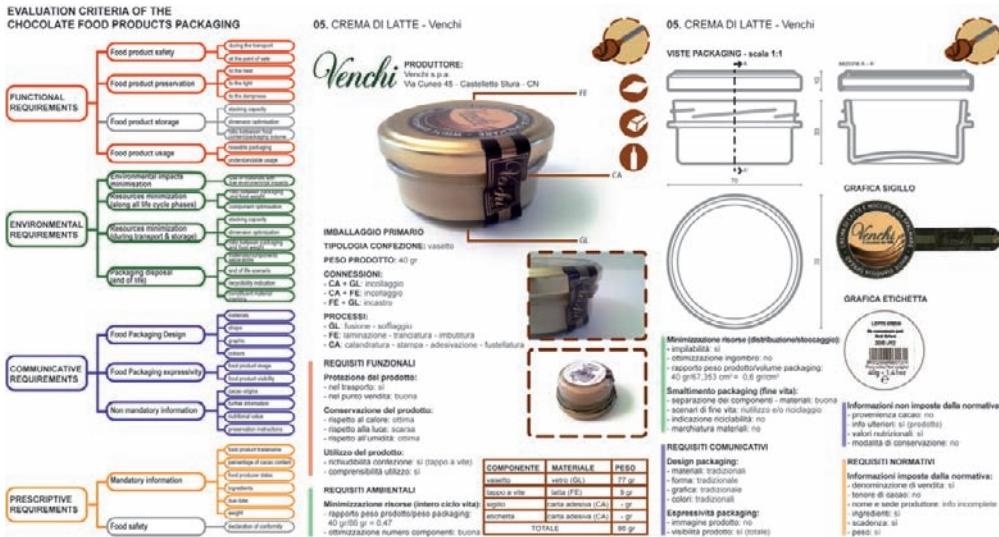
FIG. 3. REQUIREMENTS INVESTIGATED AND AN EXAMPLE OF PRODUCT FORM.

For the identification of requirements/evaluation criteria on the one hand, in the case of quantitative criteria, reference was made to SLCA (Streamlined Life Cycle Assessment) type analysis, a methodology widespread used for the analyses of packaging (Varghese 2010) and on the other hand, for the qualitative criteria the needs/requirements/performances approach extended to the whole life-cycle was adopted; a design approach, conceived in the Industrial Design Degree Course (I Faculty of Architecture, Politecnico di Torino) (Germak 2008), where man, or rather the end-user, is at the centre of the project. From the processing of the data collected, it was thus possible to outline a reference scenario allowing any type of packaging to be included in an evaluation in order to determine its position with respect to the current market situation.

FIRST CONSIDERATIONS

From the scenario analysis carried out based on the three different types of analysed chocolate packaging (creams, chocolate bar and chocolates) it was possible to deduce some preliminary considerations about the complexity of the analysed packaging (Fig. 4).

Packaging complexity, which should be related both to the components number and the mass and the material composition of the analysed chocolate packaging.

First of all, in relation to the number of packaging components which constitute the ana-

lysed chocolate product packaging, it is possible to argue that the packaging with the larg‐
est quantity of components is by far chocolates with about 4 components for each package,
followed by creams with about 3 components, and finally the bars, the category with the
largest number of samples analysed, registering an average of 1‐2 components.

On the other side, in relation to the material composition of the analysed packaging and
the related masses of material involved, by analysing the averaged masses of the samples
per 100 grams of packaged product, it is possible to see that the creams, compared with a
wide diversity of materials used, are reported to have a high usage of glass, as this category
consists mainly of glass jars. While the chocolates contribute important values of mass that
are used mainly in plastic materials and paper, all are at a lower intensity of material with
a high contribution of paper material

From these first assessments, it is possible to note how the three identified categories dif‐
fer from each other not only based on content but also according to the different material
composition of the various packaging.
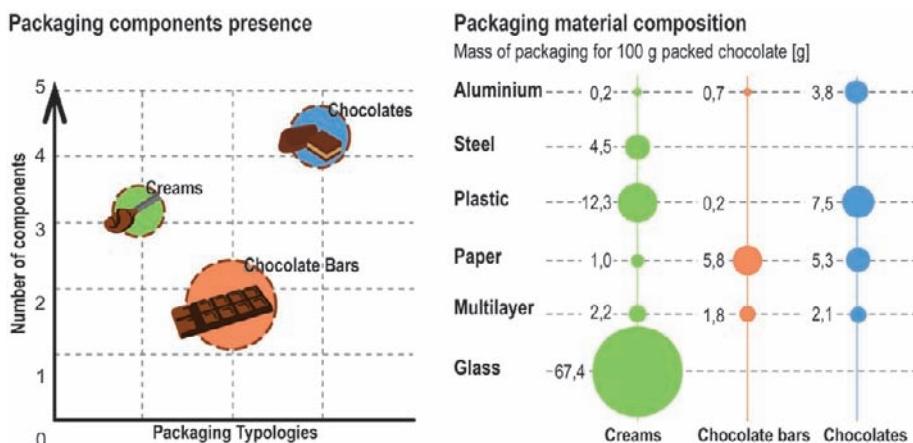
DEFINITION OF THE EVALUATION SYSTEM

FIG. 4. CHOCOLATE PACKAGING COMPLEXITY RELATED TO THE PACKAGING COMPONENT NUMBERS
AND THE MATERIAL COMPOSITION.

Based on this scenario analysis, the research carried on with the delineation of an assess‐
ment system, subdivided into two main sections. The first SLCA approach with the
quantitative evaluation of impact indicators, the second following a qualitative functional
approach.

QUANTITATIVE EVALUATION AND SLCA (STREAMLINED LCA)
The SLCA type analysis was carried out by using two main quantitative indicators of
environmental impact, namely:

· Gwp (Global Warming Potential): is an indicator that evaluates the emission of all gases that contribute to the greenhouse effect (such as carbon dioxide, methane, nitrogen oxides, chlorofluorocarbons) attributable to the various ground processing activities involved in getting the material ready for use. This indicator, also known as the Carbon Footprint is expressed in kilograms of CO_2 equivalent and is calculated by adding together the different contributions of greenhouse gas emissions, after an appropriate conversion through their specific conversion factors defined by the Ippc in 2007 (International Panel on Climate Change www.ipcc.ch). The most important detail used here is to calculate the only fossil component according to the Pas 2050 guidelines.

· Embodied Energy or GER (Gross Energy Requirement) is an indicator, expressed in MJ or kWh, of the total energy consumed throughout the life cycle of a functional unit of the product / service. In accordance with the methodology of energy analysis, the mass balance is generally calculated by adding up the different levels of energy that are involved, i.e. direct energy (one directly consumed in the production process, such as electric energy), indirect energy (the energy quota needed to make direct energy available, or energy consumption connected to the different processes of transformation inputs), feedstock energy (energy absorbed in the material input used as such and not as fuels, but which at the end of useful life still allow energy recovery through combustion, prior to being discarded as waste) and energy consumed in transport, to make the analysed material/semi-finished product available. In short, with this indicator the amount of energy consumed in food production processes are counted, to produce fuels used in the processes and transport phases.

The use of such indicators, currently used in streamlining analyses, is mainly due to the capacity of describing the potential impacts they have on the two environmental sectors which, at the time, are considered of major interest both from an environmental point of view as a whole (because they are attributable to global warming and the consumption of energy resources) and for their easy communicability to an audience of non-experts.

For the calculation of these SLCA indicators, a specific reference database was prepared by using as sources the data from databases such as the Cambridge EcoSelector (Granta Design Limited) and the studies carried out by professional associations of the European producers of the principal materials primarily used in packaging (including Plastics Europe for polymeric materials, the European Aluminium Association - for aluminium, Fefco - for paperboard, etc.). The analytical approach adopted for the environmental assessment of materials in packaging production was based on an allocation of impacts depending on the quantities of material or semi-finished product used (Ashby 2009) while further information with regard to the manufacturer's specifications for each individual package analysed was not retrieved or taken into account.

Furthermore, the use of SLCA indicators referred to the *Cradle to Gate* phase only which, for packaging materials, is easily describable using data from literature, while for the defini-

tion of the end-of-life phase (*Cradle to Grave*), on the other hand, there was no LCA type analysis. This choice was made so as not to further complicate the LCA evaluation with the calculation of end-of-life impacts and the related possible approaches (EU-JRC 2010). In the case of the end-of-life, it was carried out considering only the potential for recycling as a value in itself and by definition of the potential recycling rate from the official data of CO-NAI (CONAI 2011) relating to the particular Italian context of packaging waste disposal.

Material	End of life scenario (CONAI data)			End of life scenario (without recycling)		
	Recycling	Incineration	Landfill	Recycling	Incineration	Landfill
Steel	71%	0%	29%	-	0%	100%
Aluminium	72%	6%	22%	-	20%	80%
Paper	79%	8%	13%	-	39%	61%
Wood	60%	3%	37%	-	7%	93%
Plastics	34%	36%	30%	-	55%	45%
Glass	68%	0%	32%	-	0%	100%

In relation to end-of-life, it not being possible to start the process of recycling of all the individual material components of packaging, the degree of recyclability of each analysed packaging was evaluated on the basis of the actual recyclability of each component, in turn determined by the specific characteristics of the packaging. For example, in the case of multilayers packaging, because of the inseparability of the different materials, or because of possible contamination with the product, they were classified as non-recyclable.

Based on this observation, an average end-of-life scenario was prepared for the non-recyclable mono-material components, obtained by allocating the recycling potential to the two remaining scenarios. (Table 1). For the specific case of multilayers, the average scenario of the Italian average Municipal Solid Waste (MSW) was used (ISPRA 2011) which provides that approximately 12.1% of the RSU produced is sent for incineration with the remainder used for other scenarios, and for the specific nature of multilayer that may be approximated with a single landfill.

In summary, together with the SLCA indicators, a further quantitative indicator relating to the recycling potential elaborated in a specific Italian context and the quantitative evaluation given by the ratio between the weight or mass of packaging used and the amount of product contained was also undertaken, to highlight the volume of material used.

QUALITATIVE EVALUATIONS

On the other hand, the qualitative assessments, are derived from the adoption of the demand/requirements/performances approach extended to life cycle, which allowed the identification of the functional, environmental and communicative requirements that must be satisfied by packaging. These requirements once used as reading criteria in the cataloguing of the various products covered by the analysed sample were then converted into evalu-

ation criteria. Easily recognisable and assessable criteria through direct observation of the package, the assessment of which was based on dichotomous value scales (yes/no), based on the fulfilment or non-fulfilment of the investigated requirement.

Some of these criteria are directly linked to the known performance that packaging must generally meet; others have been specifically designed for the packaging of chocolate.

Finally in relation to the obligatory functionality criteria, dictated by the regulations in force concerning packaging, these were not taken into account in the evaluation system because it is assumed that the various packaging analysed in the sample respected them, thus providing no additional useful information in the delineation of the evaluation system.

The qualitative criteria investigated are as follows:

1. Functional criteria: in this group are collected criteria that evaluate the performance of the packaging during use of the product, such as
· Stacking capacity: the ability of the packaging to be stacked due to the formal characteristics and mechanical resistance of the packaging and / or of the product itself.
· Resealability: if you can open and close the packaging several times. Typically this requirement is actually inspected by the designer only through special design techniques.
· Reusability: criterion that is based on the fact that the packaging can be reused for other purposes and should therefore be designed for that purpose. This criterion has been used mainly for the evaluation of packages for chocolate creams.

2. Environmental Criteria: this group involves the environmental performance criteria of each package during the life cycle or specifically focused on the end-of-life to help the end-user in the disposal of the packaging. This group includes prerequisites such as:
· Separability of the components: this requirement is satisfied only if the components are separable to allow the collection of different materials to assign to the several waste treatments.
· Presence of the marking of the constituent materials: this requirement is satisfied if the recognition markings pursuant to Directive 94/62/EC are present on all of the constituent materials, or information on their correct disposal is provided by means of symbols or labels.

3. Communication criteria: in this group are included criteria that assess the communicative capacity of the packaging in relation to the contents or to the proper management of the packaging, including, for example:
· origin of cocoa: criterion developed to assess the willingness of companies to openly communicate the quality and sustainability of the chocolate product.
· nutritional value: criterion used to assess the willingness to communicate information in relation to nutrition, and help users attentive to the problems of correct nutrition.
· preservation method: criterion used to highlight the possibility of communicating to the customer the correct management of the product also, through the proper use of the

packaging itself.

For each of the criteria considered a score based on the satisfaction or otherwise of the specific requirement in question was allocated.

Up to now only these qualitative criteria are taken into account into the multi-criteria evaluation system, but in the next research steps, there is the aim to increase the qualitative criteria numbers, by the inclusion of many other criteria.

FROM THE EVALUATION CRITERIA TO THE ELABORATION OF THE ASSESSMENT

From calculations carried out, the different categories show values, averaged on the sample, very different from each other. For example, the packaging for chocolates registers higher Carbon Footprint values compared to the other two categories, a value in contrast with the quantities of used material (Fig. 5), which shows the creams category as the one with the greatest mass use of packaging with an equal amount of content. This observation refutes the common idea that lighter packaging necessarily leads to environmental benefits. However, the interest of the study is not to highlight the differences between the categories but to show how, within the same category, it is possible to find different result ranges that describe the current scenario of chocolate product packaging in order to develop an evaluation model, to be used for the assessment of packaging relating to the three categories defined.
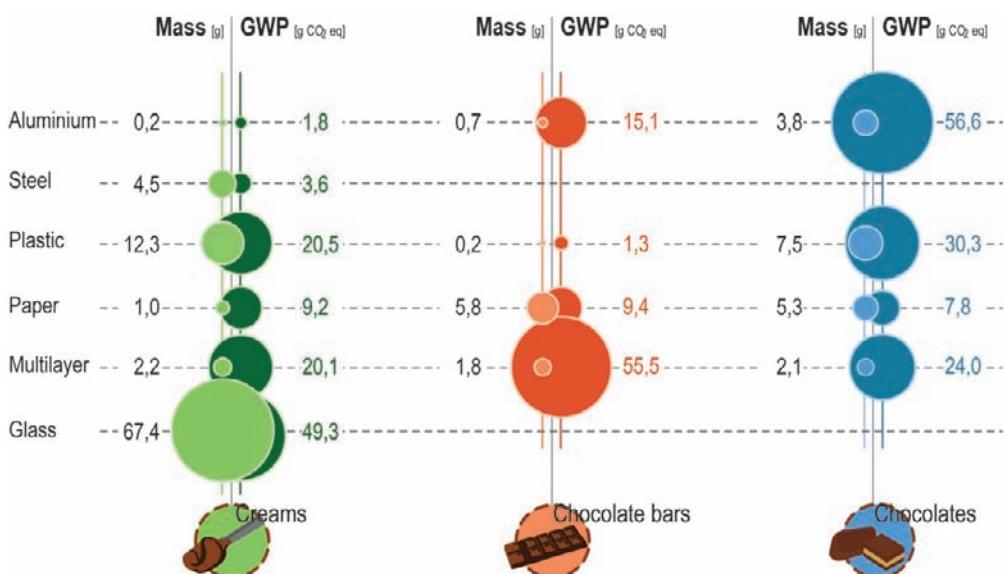
FIG. 5. CARBON FOOTPRINT VS MASS FOR 100 G OF CHOCOLATE [DATA IN GCO$_2$EQ].

From calculations carried out both by quantitative and qualitative evaluation (Fig. 6-7), average values for each indicator within each category were extrapolated.

Starting with the average value, the upper and lower average values of the sample were identified. Using the maximum and minimum points recorded as further reference, the division of the variable of the results in 5 representative ranges was obtained (Fig. 6-7), that is:

· average values: values included between the upper and lower average of the samples analysed. This value equals to 3 – Average;
· values above average: values included between the upper average and the maximum value analysed. This value is equivalent to 4 – Good;
· values below lower average: values included between the lower average and the minimum value analysed. This value equals to 2 – Bad;
· values lower than the minimum analysed. This value equals to 1 - Very Bad;
· values higher than the maximum analysed. This value is equivalent to 6 - Excellent.

The assessment from 1 to 6 can be reversed on the basis of the indicator under analysis, following the principles of "more is better", i.e. the quantitative attributes of percentage of potential recycling or by adopting the principle "less is better", i.e. the quantitative attribute of carbon footprint.

The identification of the thresholds is different for the two types of adopted evaluation criteria. For the quantitative indicators the average is elaborated as a mathematical average, without using weighting factor.

For qualitative indicators, the ranges are calculated by using a different approach because qualitative indicators are weighed with a dichotomous values (Yes/No), as a result it is not possible to elaborate upper and lower averages.
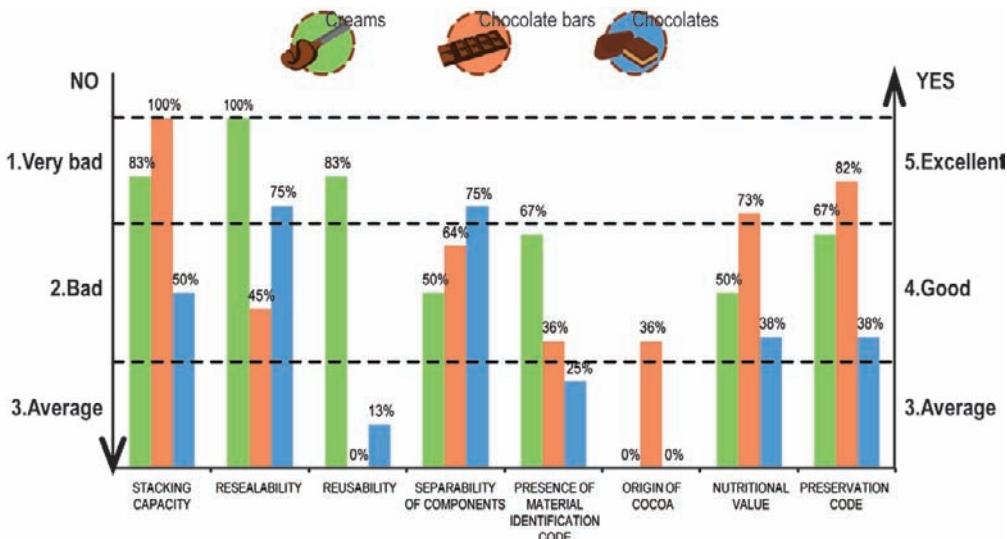
FIG. 6. EVALUATION OF QUALITATIVE CRITERIA AND CONVERSION IN 5 RANGE.

In this case, the assessment of the qualitative indicators is referred to the definition of the at⁄tractive quality of Kano theory (Kano et al 1984), which differentiates the quality attribute in five categories, on basis of perceived quality by the consumer.

Specifically inside the Kano theory the five perceived quality attributes are the following:

· Attractive quality: the attractive attributes can be described as surprise and delight at⁄tributes; they provide satisfaction when achieved fully, but do not cause dissatisfaction when they aren't fulfilled;

· One dimensional quality: these attributes are equivalent to the satisfaction when they are fulfilled and dissatisfaction when they aren't not fulfilled;

· Must⁄be quality: these attributes are taken for granted when they are fulfilled, but, when they are not satisfied, they lead to dissatisfaction;

· Indifferent quality: this kind of attributes refers to aspects that are neither good or bad, and, consequently, they do not result in both customer satisfaction or dissatisfaction;

· Reverse quality: the reverse attributes refer to a high degree of achievement resulting in dissatisfaction (and vice versa, a low degree of achievement resulting in satisfaction) and to the fact that not all customers are alike.

In the same way of other previous studies that investigated these attributes in the packaging area (Williams et al 2008), the Kano quality attributes are also adopted in this research, but they are adapted to the research goal. As a result in order to convert the qualitative evaluations, that are included into this evaluation system, into a range of 5 groups, only two of the five Kano attributes categories are adopted in this research: must⁄be quality and attractive quality.

Furthermore, even if the perception of quality attributes normally is elaborated by a cus⁄tomer investigation in order to understand how the customers perceive the quality attrib⁄ute, in this research the purpose is to clarify how in the current market situation the quali⁄tative indicators, that are adopted in the food packaging evaluation, are fulfilled or not.

Therefore for each product category a percentage of fulfilment of each qualitative indicator has been calculated. This percentage has been used as reference value to define if a qualita⁄tive indicator is a must⁄be quality attribute or an attractive quality attribute depending on the sample behaviour.

In other words, if the majority of the packaging of the sample fulfil the requirement it means that the requirement can be defined as must⁄be quality attribute, and on the con⁄trary, if no packaging of the sample fulfil the requirement it means that it is an attractive attribute. Between these two attributes three degrees of judgement are set.

An example of the assessment procedure is described hereinafter.

All the chocolate bars packaging fulfil the functional criteria of stacking capacity, it means that if the assessed packaging fulfil the stacking capacity, the value assigned (from 1 to 5) is equal to 3 (average), because the criteria is a must⁄be quality attribute.

Otherwise if no packaging in the sample fulfil a requirement, as in the case of the re⁄usa⁄

bility for the chocolate bar, and the packaging that we want to assess fulfil the criteria, as a result, the assigned value will be 5, that is excellent, because the criteria has been defined as attractive quality attribute.

Thanks to the elaboration of the ranges in this way, it is possible, by carrying out an analysis of a chocolate packaging with the same procedures described in the paper, to transform the evaluation of the quantitative indices into value judgments so as to relate them to the qualitative indicators previously analysed (Fig. 7).
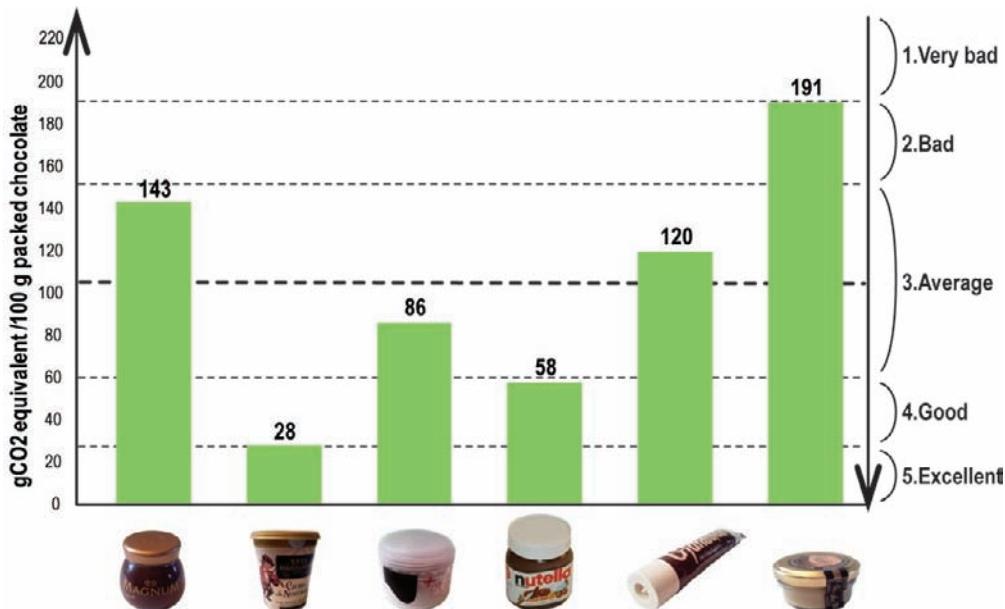
FIG. 7. EVALUATION OF QUANTITATIVE CRITERIA AND CONVERSION IN 5 RANGE.

Wanting to transform the judgement on all indicators into a single yardstick, as indicated by the goals of the Poliedro project, the last step in the definition of the evaluation system is the creation of weighting systems for the various indices. This final part of the work is still considered to be in the development stage.

Furthermore, all the criteria adopted up to now into this packaging evaluation system, are easily described and shown in a "spider" graph (Fig. 8).

By using this representation of the results and thanks to the fact that all the measurement are translated in a judgement from 1 to 5, the evaluation carried out should be also useful during the design stage for evaluating the several solutions of new design packaging.
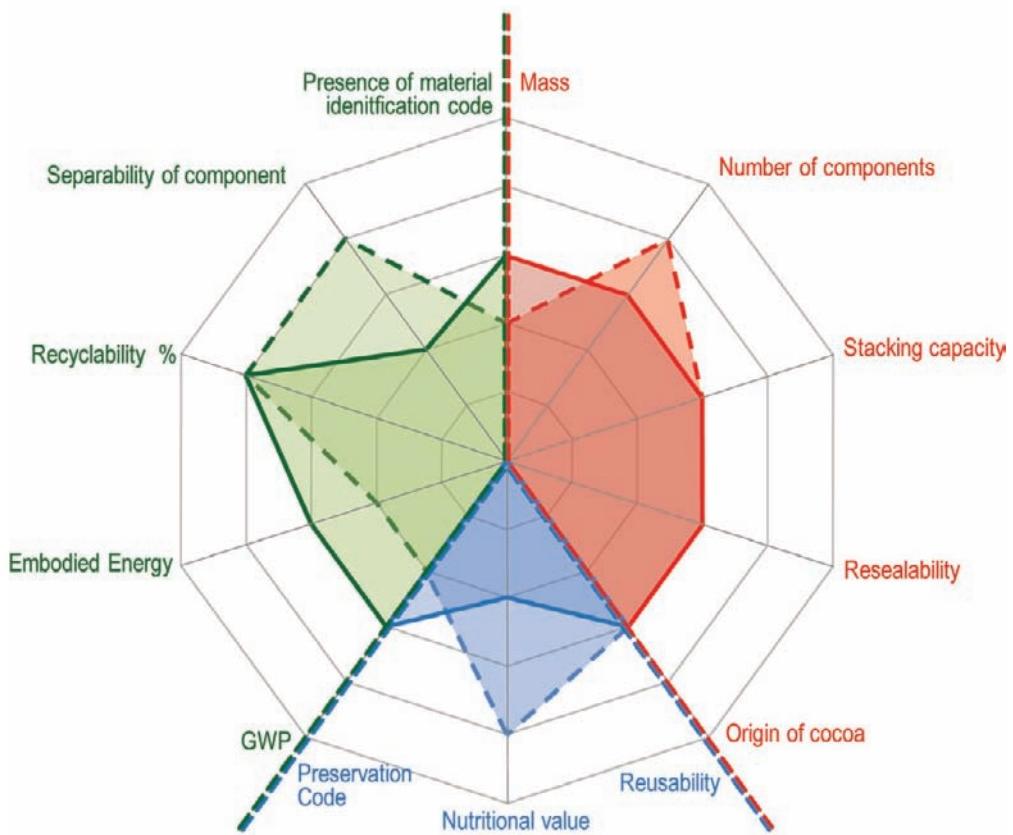
FIG. 8. REPRESENTATION OF THE RESULTS AS A "SPIDER" GRAPH.

CONCLUSION

In conclusion the paper illustrates the results collected so far in the definition of a multi-criteria evaluation of the sustainability of the chocolate products packaging.

A multi-criteria evaluation system that can be an useful tool for two different aims:

· as a multi-criteria system evaluation that will be included in the Poliedro Index;

· as an instrument for assisting the designer into the evaluation of the different alternatives of new design packaging

An evaluation method that in the next steps of research will be verified with the analysis of two successive case studies of wine and meat and with appropriate adjustments may then be used for the evaluation of the packaging of agri-food products in general.

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RELATIONS WITHIN THE HOME SYSTEM

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The actual production model, is largely ruled by the need of volume maximization.
Basic requirements for the survival of this model are the uncritical consumption and lack of interest to sources of raw materials for production.
Even in household appliances market we see how this linear model is so rooted, with a typological supply reduction, that doesn't take into account cultures of territories.
In order to transform the current "home product" into "home system" the starting point could definitely be the food: changing the perspective in which we consider food will consequently change the appliances too.
Actually the connection of house with context is only water and energy supply, while the processes that regulate food and products have no real and deep connections with the territory.
Globalized food passes through houses and it is processed by standardized household appliances.
The distance that stands between food and context where it is consumed are:
· *Physical*. Food is cultivated far from consumption area;
· *Temporal*. Its consumption is independent by seasonality and expiry times:
· *Cultural*. It is completely disconnected from the tradition, cooking and conservation practices;
· *Commercial*. A lot of economic intermediaries stand between producer and consumer.
On the contrary if we see food as a result of interrelated processes linked to the territory, in the same way we could design appliances connected to each other, deeply influenced by the context where they are located.
The "home system" is the design area where we can apply this shift, considering inhabit as a network of relationship between subjects, appliances, architecture, behaviors, food and products.
A result of this production approach is the consciousness of people that make choices and become active subjects; they are aware of the consequence that their actions have on the system where they live.
This vision brings not only more healthy and conscious lifestyle, but it leads to a co⁄

evolution of the three actors of the system: companies, production and territory, instead of bloody competition we see today between them.

••• Systemic design, components, food, health, territory, water,
energy, house, subject, user •••

The goal of this paper is to show how an approach based on knowledge and awareness can lead to a positive change related to the environmental and economic crisis. This bottom-up change operates on the global consumption, which is the actual economic model, to reach good effects on wellness, shared wealth, environmental and ethic sustainability.

ECONOMIC CRISIS AND ENVIRONMENTAL CRISIS

At least from the second half of the last century, the international scientific community was able to document, with an increasing deepening, the dramatic effects that the continuous and unceasing behavior of human kind wield on natural systems to satisfy his needs.

The fragile balances of the natural systems are put to the test from at least two centuries and an half (from the beginning of the Industrial Revolution). The stress upon the nature by the man is so strong that geologists use an informal geologic term to describe the period we are living: the *Anthropocene* period.

This is one of the evidence that scientific community knows very well the destructive effects of our actions against the ecosystems, so that we can compare these effects to the big geological dynamics that shape the life of our planet.

In the last "Living Planet Report 2010" published by Wwf, it is described the state of the art of the ecologic footprint of countries, and once again it shows that we are collecting an increasing environmental deficit.

International scientific community describes every day the effects of our impact on natural system of the Earth, that still remains the only source we have and that is the base of entire world economy and our wellness.

The actual economic and financial crisis is a huge and serious problem, but our ecological deficit is much more worrying than any other crisis we went through, and the environment problems are most of the reasons why the economic crisis has risen.

The worldwide economy has grown with a terrible rhythm within the last sixty years. The gross world product (Gwp) reached 69.000 trillion dollars in 2008, and already that year, there was a soft deflection in the annual growth rate, due to the current economic crisis. In 1950 the gross world product was only 6.600 trillion dollars, and since then, in sixty years, we have almost tenfold. It's foolish to believe in a continuous and relentless growth of the gross global product, also because if we open our eyes, the reality that surrounds us has very obvious limits.

The economic and environmental crisis are two aspects of the same phenomenon. As

pointed out by economist Jean-Paul Fitoussi, "at the centre of their perverse functioning there is the same ethical problem: the preference for the present, and its corollary, the depreciation for the future. In this tension between long-and short-term it's narrow the deeper connection between the financial crisis and ecological crisis."

We are thus faced with a crisis of the System, which is a clear symptom of the unsustainability of endless growth, that is aspired by the economic and financial approach that we continue to adopt today we are unanimously witnessing that the development system, which dominated previous decades, is very precarious.

Contrary to our economic model, all the Earth's natural systems can renew themselves and generate life. That is why the ecologist Eugene Odum (1913-2002) called them "life-support systems".

Our dominant culture leads us to neglect, and often to ignore, the processes and functions performed by natural systems, and each time we use them for our welfare, weakening or damaging their resistance and resilience, we difficulty understand that doing this we are reducing our chances of development for the future.

As ecologists have shown us, humanity is closely dependent to processes, features and services that natural systems provide to us.

The health of humanity is therefore closely linked to the health of ecosystems and biodiversity, which are the basic constituents of natural systems.

As humans we are also a component of natural systems: without them we would not be able to evolve, and we will not survive without these.

The man is heavily altering the functioning and diversity of planetary ecosystems, this is reflected in a significant impact on wellbeing, economy, wealth, and happiness of society and therefore requires urgent and concrete actions to reverse the trend.

The challenge we face today has very significant proportions and the only hope we have to win is to involve everybody, starting to work from the bottom. It's about understanding how current 7 billion of humans can live, and, since the number increase (there will be at least 9 billion by 2050 according to UN estimates) to guarantee them an appropriate lifestyle without causing the continuation of the devastation of natural systems. In order to do this we must seek to radically change our consumption model, that today needs to be continuously fed and generates all the problems described so far.

THE HOME SYSTEM

If we analyse closer our research field, so that it's possible to operate in a more tangible scale, it's possible to identify two closely related views: *System Home* (space where the man works at the individual level) and the *Territory system* that surrounds it (the space where man relates the collective level).

Currently, these two horizons don't have much in common, except for the unconditional exploitation of resources, both far and nearby, in order to ensure a welfare based on eco-

nomic growth without end.

Our goal is to identify guidelines for design, applied to the large scale production of tools, that will contribute to change human behaviour, by favouring the evolution of the only consuming model which can preserve a future for our planet: the *environmental sustainability linked to an ethical wellbeing.*

A fundamental characteristic of our design methodology is to consider the man as an active part of the natural system. This bring to consider Man as the centre of the project, in opposition with the mainstream approach that consider the Product as the centre of the project[1]. A particular attention is paid to the conditions that determine the well-being for man, both for the healthy condition and the emotional serenity.

One of the most important environment for man is the house. In this place, more than in others, is expressed the way of life we really lead, with its consumption and aspects of everyday life.

If we analyze the home condition with the critical approach borrowed from the Systemic Design methodology, we can find a variety of issues and problems that can be improved and that gives us the chance to trigger the requested change.

Within the domestic context we can find many of basic needs that humans have in life, one of these, without a doubt, is the need of food.

To take advantage of the "*food resource*" in order to satisfy our basic need, we involve several other resources (such as energy and water), occupation of spaces, use of tools (such as household appliances) and implementation of specific actions.

This creates a dense network of relationships and flows of resources within our context that we can define without doubt "*Home System*".

Just for the origin of the resources that we use in the house system it should be related with what is around: the *territory.*

In this case, the network of relationships and flows of resources widens considerably, but if you proceed slowly moving away, we see that the area surrounding our home system is just another system which interacts with it right through these exchanges.

In our model, the Home System and the Territory System are *open*, and are made of a network of relationships that extends its scale and that can expand more and more involving systems that are near and it is convenient to have a comparison.

This model with which reality is reconstructed, according to the Systemic Design approach, refers to natural systems. In nature, all the flows imply a *continuity of movement* without barriers, and the fundamental condition because what happens is their valorisation so that there won't be any waste to dispose, but each flow find always its location and its usefulness. A natural system is always designed in terms of its flow and its evolution will always go in that direction. There is nothing that is evolving in a static way, all interact

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[1] Luigi Bistagnino. 2008. *Uomo al centro del progetto, design per un nuovo umanesimo.* Torino. Allemandi & C.

with what is around to reach a single purpose: the self-organization (or the autopiesis in case of natural systems)[2]. By studying these aspects in depth, you can discover a wide variety of connections that can coexist with the most diverse phenomena and targets.

If we intervene in the domestic sphere with a systemic approach applied to the project, there must be taken into account the requirements that the design of products such as appliances have, and all the behavioral aspects that come into play referring to man.

The product at this point can be considered as a *system of components* that relate to each other with the aim to perform a function, using resources and creating connections with other tools or with the user.
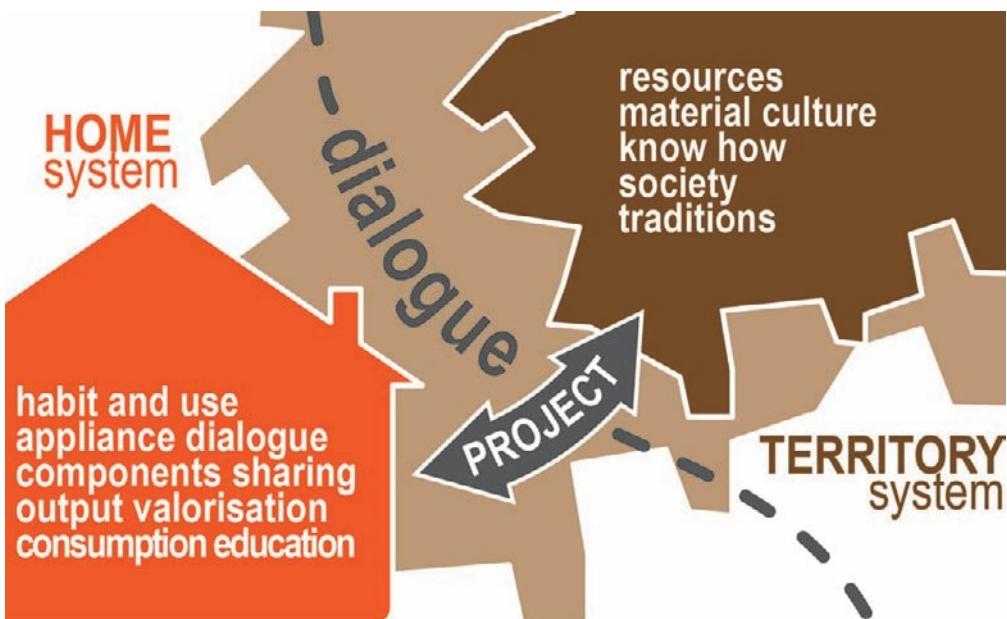
By focusing our attention upon these smaller scale areas, such as appliances, and gradually expanding until reaching the home system and the territory system that surrounds them, we will organize the flow and the relationships such as energy, water and air, trying to optimize them and exploit them in order to maintain an overview of how performance goals and functions to accomplish.

The result of this design approach will be the dialogue between these actors, which are

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[2] The term autopoiesis was coined in 1972 by Humberto Maturana, from the Greek word for *auto*, that means "self" and *poiesis*, that is "creation". In practice, an autopoietic system is a system that continuously redefines itself and inside it sustains and reproduces itself. An autopoietic system can be represented as a network of processes of creation, transformation and destruction of components that interact with each other, support and continually regenerate the same system. Moreover, the system defines itself: the domain of existence of an autopoietic system coincides with the topological domain of its components. (Maturana, 1973)

[3] We consider Subject as an evolution of the *prosumer*, decribed by A. Toffler (1980, Toffler)

linked each other also on larger scales, strongly characterized by the context in which we find ourselves.

SUBJECT NOT USER

The project itself is not enough to satisfy the needs and to make the system work properly. The fundamental importance is the man with his habits and behaviours, his choices and actions that he takes. To set in motion the mechanism that will bring us closer to a new consumption model the active role of people will be very important: the human is considered as a *Subject who think and is conscious of the consequences that his actions can produce*[3]. This growth in the role of consumer allow the Subject to perform the actions in full awareness during consumption and to be free from the passivity that characterizes the *User*, who uses or consumes something in a unconscious manner, just because it is easily available.

In doing so the man at the centre of our project takes off the User mask, dressed up to now, to wear the one of the Subject; he will begin to decide what to do with critical sense and he will leave a behaviour moved by habits, by the comfort and lightness.

The advertising and marketing have always focused their attention on this habit of unconscious behaviour, giving rise to reference groups to analyse and to fit the design: the so-called "target". In this way the features have been simplified and cultural identification of people then gathered to belong to homogeneous groups, easy to define and manage, thanks to a strong flattening of the tastes, needs and requirements.

This approach has not only made things easier to deal with the consumer, but it started in taking a simplistic approach, usually trivialized when interact only with products far away from cultural or territorial identity, always identical in all places where we go. This is evident in supermarkets or shopping centres now exported globally, where we always find the same types of stores with the same brands and same products, these stores are designed to be

recognizable as belonging to a chain, but outside from the local context and culture in which they are located. In this way it leverages on weaknesses of users, styles and trends dictated by them is induced to buy a product not for its true quality, but rather to the lifestyle that is suggested.
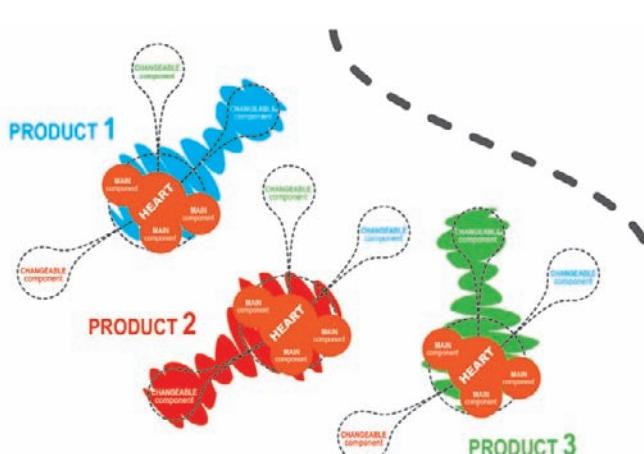
THE CURRENT CONSUMPTION MODEL

Just as users, individuals who have the privilege of living in developed countries and can afford a comfortable standard of living, are used to consume goods and products that no longer have any relation to the context in which they are located.

Their only link with the user is to perform a function that he choose.

In this sense, the current market is the result of an evolution that has focused on increasing its size, damaging those weaker realities that in some way hold onto the territorial origins.

If today we have to buy an appliance almost without a doubt we will turn to the big super-market chains that speaks to us through some distribution giant, owner of specific chains of supermarkets, shopping malls or on-line shop we do not know the origin.

This strong imbalance towards mass production and the resulting distribution has out-sourced almost all actors in a supply chain, and consequently also the distribution.

The global undifferentiated users will have ideologically the same features and the same needs wherever they are and at any time because it belongs to that target audience the industrial giants are designing for.

If for example the most widely identified food conservation method is the refrigerator, this will be the same in all parts of the world, but at the same time it doesn't belong to any of these context: a citizen of the Mediterranean area in the kitchen will have the same machine we can find in the homes of the Scandinavian countries, however, this does not take into account that in the very first case the outside temperature is likely to span the entire year will never go below its internal temperature, while the latter is in a context where, for most of the year, the temperature outside the housing is much lower than the temperature inside the refrigerator, making it ridiculous and insane energy expenditure for the conservation of the temperature, when you could use what mother nature puts available[4].

Paradoxically, in those places where the temperatures are so low, the man in order to live comfortably use energy to heat his home and then other energy to cool a closet used for storing food in the kitchen.

In this way, however, the large multinationals in the market of household appliances will not have to worry about anything except to continue to produce more pieces to a larger number of consumers and find some winning strategy for selling.

Giants will no longer produce in countries where they have the capital, but the production will be outsourced in the so-called "southern countries" where they can take advantage of a more moderate labor costs, without regard to respect workers' rights or issues such as the disposal and end of life, these countries often serve as industry but also as landfill at a planetary level.

Doing so huge amounts of resources are transported from one part of the world to another

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[4] We don't face here the problem of the conservation technology (that can be a deep design issue), we are just comparing two identical process (using energy to decrease the temperature for the medium-short term conservation) in two different countries.

following criteria only suitable from economic point of view, thus creating unbridgeable gap of resources with the sole purpose of producing an increasingly unbridled consumerism. This relocation brings to an extension of the scale of distribution and this have a double cost: one on the economic level that users will pay, and the other in terms of sustainability that will be paid by the environment.

Beyond that comes another very important actor in this kind of model: the one who takes care of logistics. For moving all these goods a lot of money will be managed and he will directly interface with the distribution so to influence the market price and the decision. He can speculate exploiting the large number of passages in which he is involved and will have a good gain over the network built specifically upon these shifts.

All this belongs to a single frame: the sad effort by the whole world to lead with a frantic lifestyle that in the past gave us the well-being but now is putting our future at risk.

To feed this mechanism several strategies are used: to constantly have new products to churn out, the market only changes their form, so the trends and fashions are followed, the user feels satisfied but he most likely has acquired a product that has under the new skin approximately 70-80% of the same components that the model before had[5].

The *obsolescence* plays a very important role: consumption is driven by fashions and trends imposed by a not-so-honest approach of marketing agents. The consumer has to buy forms to pursue a lifestyle that he is suggested to follow by a truly bombardment of advertising.

[5] cfr. George Dieter, *Engineering design: a materials and processing approach.*

When these forms are no longer rapresenting the desired lifestyle, the object will be obsolete. In the worst case the object in question will stop working properly after a predetermined period, this aspect is part of the even less ethical strategy of *planned obsolescence*[6]. You can't repair it so you will throw it.

A product made by components is currently designed to be easily *assembled*, in this way will save money and time during production; naturally if somebody products components in the other side of the world, during the assempling nobody try to understand how they works really. A fast assembly doesn't mean a fast disassembling: in fact both maintenance and dismantle are difficult operations, due to irreversible connections or closed components. The manufacturer have achieved its purpose: when the product doesn't work anymore, if it is impossible to repair it will be replaced by a new one.

This results in a drastic increase in the number of end of life objects, that will fill up landfills. It will be difficult to separate materials they are made, and so the disposal will be very difficult[7].

The tools we use are closely related to the lifestyle we lead, our traditions and culture. They change during the time following not only the trends but also the needs, as we can see in the evolution of form and the importance of the freezer.

If we pay attention, during the last forty years, the freezer appeared upon the refrigerator as a little space dedicated to ice and to those few goods which need very low temperature. During time, the little space become bigger and bigger, until cover the entire space of the

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[6] *The Light Bulb Conspiracy* (2010) is a documentary about planned obsolescence that can be seen on.
[7] Despite the disassembly of the industrial level is difficult and expensive, there is an increasing number of artisans who dismantle, recover and repair electrical and mechanical tools. This practice, which in India is called *Juggard*, is so widespread in big cities to give work to entire neighborhoods. (cfr. Thackara 2005).

appliance, making necessary to double the tool used for conservation.

The evolution of size and performance of the appliance can be find in the increasing importance of the *cold chain* in our daily life. In fact the frozen food, easily ready for use after a quick cooking, even in the microwave, is the perfect source for the quick meals that the lack of time forces to have.

So we have at home an increasing amount of frozen food ready for use anytime, the conservation time is long, we forget to take care of them because we know that they will never betray us, they will be ready in five minutes. So the size of the freezer have increased to meet the consumer space problems.

Simply analyzing the formal evolution of a mass consumption tool, we can recognize the uses of consumer and their changes over time.

Adopting the cold chain consume model has of course consequences that go beyond the evolution of the freezer. Infact when we choose to buy a frozen food we accept and finance a system where the distance between food and consumers becomes larger than ever.

In particular we identify four different kind of distance, which are:

· A physical distance. Thus justifying a long chain of logistics that will travel hundreds of miles to bring a food on our table that has nothing to do with the territory in which we live.

· A distance in time. This food will be grown all year without complying with its natural season, its development will be blocked to allow the long transportation, and to guarantee that it will not go bad, it is grown with pesticides and metabolizing to suit the needs of conservation.

· A commercial distance. None of us really knows the provenance of what we eat, its quality will be guaranteed by a brand that often has an appeal that has little to do with the chain that is behind the product. The presence of intermediaries forces us to shop only at

Large Retail Trade, where there is a boundless offer, but unfair prices.

· A cultural distance. The impoverishment of diversity, caused by monocultures crop and intensive cultivation, leads to the loss of local traditions of preparation and cooking of foods, which in the countries are not only diet, but has also a social and cultural role.

If we analyze in detail the flow of food, seen as a resource that pass through the home system, we immediately notice that before arriving on our plates, the foods most often face a lengthy chain of events.

Take for example a fruit that we normally find at the supermarket. With a few exceptions, it is very likely that this has been intensively cultivated with the use of pesticides, hormones and antibacterials. His appearance will be pleasant, we can find it throughout the year and come into our home aseptic, sterile treatment due to its production chain. But the place where it was grown is where labor is cheaper for farmers, that means far away from industrialized weasten countries. Knowing that it has to face several miles to travel, it is picked before the harvest is mature, in this way it is bitter and the skin is tougher, but it can be stock in larger chests without crush or bruised. Before getting to the point of sale has been stored in a warehouse retailers, these reserves represent a stock, immediately available according to market demand, it could stay in these places also for long period, so it has to be frozen, always before its maturity. When the time comes to appear on the counter of the supermarket will be defrost and may conclude its maturation cycle traveling again. All these steps are carried out thanks to technology and chemistry currently available, but what are the repercussions on our health?

The choice of food we eat every day significantly determines our health but also influences the shape of our territory, that's why the consumer should finally be active and critical in his choices.

Recent research in the medical field have confirmed that the so-called autoimmunity diseases, as well as allergies, are becoming increasingly affecting younger individuals. These studies have indicated in the food the main cause of these diseases. If we consider our diet we realize that often it consists of foods from industrial processes.

In addition to these problems that concern us, through our actions we facilitated the development of a long food chain, which initially involves the intensive use of land with all its devastating consequences in terms of environmental sustainability and exploitation of underpaid labor in less developed areas.

Thus once again the logistics behind a food product expands excessively, requiring unnecessary infrastructure for large-scale displacements and a great deal of effort, money and energy to go around.

Will be involved in the chain a series of totally unnecessary steps, whose cost is essentially paid by consumers, through higher prices of products, and by the environment, that seeks to absorb the deficits caused by changing its natural balance.

Also problematic is a further aspect the possession of excessive power by the intermediaries

involved in large-scale retail chain, to safeguard their earnings are convenient to ease the problems of long series of steps. The "buyers" of the retail buy the fruits on the market and put them on the market, it is very common, however, that their actions are dictated by the laws of the market and food is viewed simply as a commodity to be sold like any other industrial product.

These goods are no more food with nutritional and organoleptic qualities, but economic value to be achieved at any cost. Then will be trigged mechanisms associated with supply and demand: the more you sell easily and more there will be demand, products will be available anyway, not minding the limits of their rhythms... This urgent demand to increase the production flow, get stressed natural processes and acts on the fields as if you were in front of any manufacturing sector, not in relation with a cycle / process that is subject to seasonality, for alternation of crops to renew and maintain the wealth of humus in the soil.

Because of this centralization of power in the market who loses from economic point of view are the growers, who not only assist the progressive impoverishment of their fields with the consequent requirement for investment in measures from intensive cultivation to keep them productive, but the less lucky and the less powered will have to sell their products to mass retailers just because this follows the rules of the market.

However, what should worry the consumer more than anything is the apparent lowering of the quality of food. The quality is too easily forgotten in the crops, on farms and in industrial production, but food is still communicated through trademarks, statements and rhetoric. In fact the consumer has no choice but to reach this compromise of trust "as reported". This is because it is not possible in these cases "really touch it with my hand." We lost all contact with the actual origin of the food and who produced it.

And here we return again to all the effects in the dynamics of a "driven consumption". The user has to decide influenced by the opinions of the offer and has not even put in a position to judge whether these are reasonable or not. Thus once again we have a real consumer education, and we lose touch with the real value of things.

THE TERRITORIAL SYSTEM

Domestic activities associated with food are many and this is the reason why this resource deserves further attention. Our design approach is closely linked to the tools that the subject uses to relate to it. As one of its basic needs of man, the time for purchasing is a delicate stage in our model of consumption. Finally, all activities related to food production have evolved by developing a closer link with the natural systems from which they come, they are the same people who surround us in the end.

In recent decades, the way we consume has however turned these food activities, once related to seasonal and local time, in activities disconnected from space and time, placed in areas just for their logistical or economic factors.

This approach has generated considerable impact on the cultural level (the know-how of an area), ethical (speculation on weaker actors) and not least in importance on the environment (generating a constant dispossession of land, often leading to changes in crop typical and the divestment of the territory).

All these aspects are actually connected with the wrong approach we are leading at the global level.

As we can confirm by the historical point of view, a region is characterized in time and space from the sedimentation behavior that we find on it and its peculiarities.

In a specific area there will be specific *resources* avaiable and not others that can be found on the other side of the world. Historically, these resources have been exploited for its goals, which has developed a well-defined *know how*, connected with the place where he lives.

Over the years this is going to be able to stratify and then in that territory has developed a tangible *material culture* with lots of customs and cultural aspects, all unique, that we can't recognize as same in another territory.
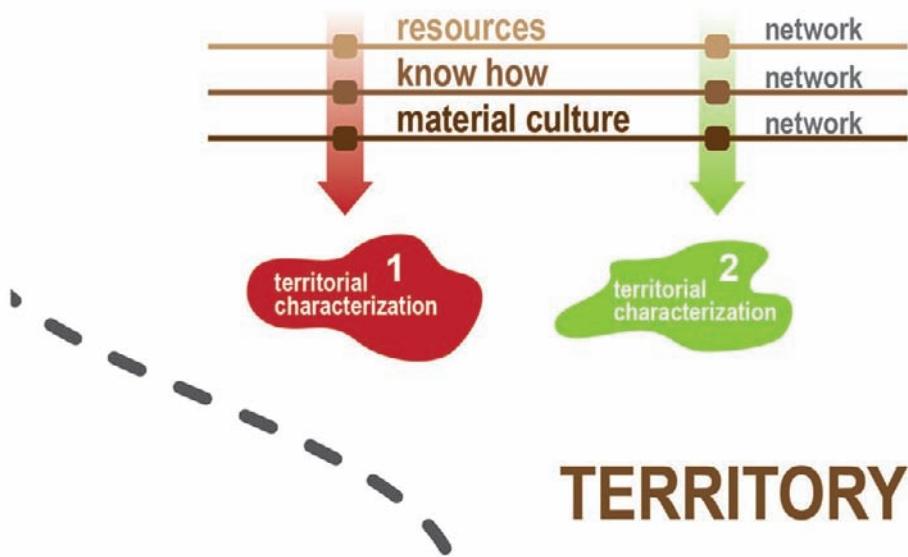
DESIGN FOR A NEW CONSUMPTION MODEL

So a new consumption pattern can be articulate between any of these parameters: the Home System, the tools, the territory and the subject. What matters is to keep in mind their close relationship, so similar to a real life relationship.

In our design process will be taken into account the dialogue that will develop between the various guidelines.
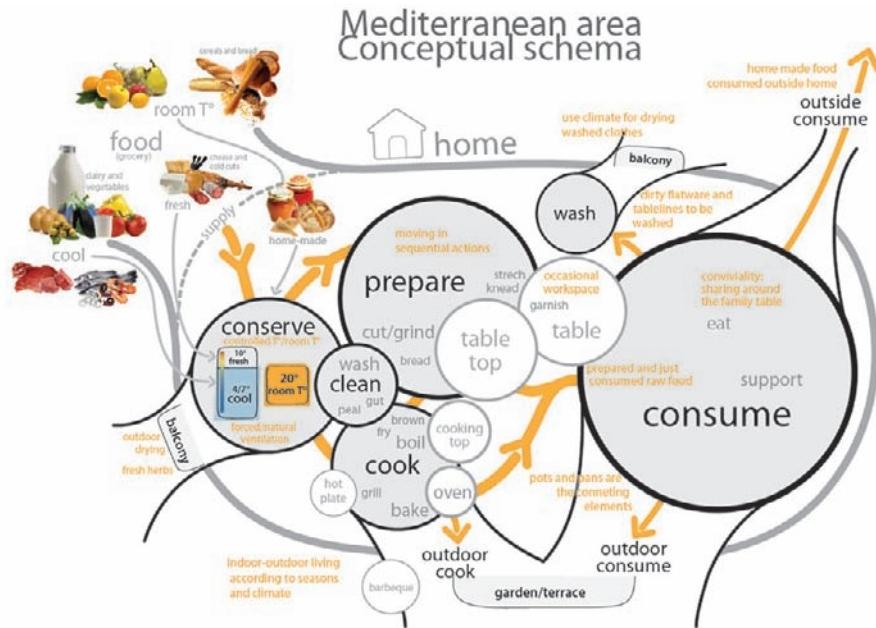
The first active player in all this is us, subject really aware of their chosen place in the center of this system.

The home system will be considered by a holistic point of view, that will highlight all the dynamics involved in it. We analyze the flow of resources moving into the system, creating a functional model of reality takening into account flows over resources like water and food, energy from the network at various levels. In addition to this we will analyze the processes that occur within this system, every actions carried out for an objective. These processes require the input for their implementation, will reach their goal and produce the output. To do this we establish the precise relationships between the actors that come into play and the contexts belonging to the system.

This type of analysis will be twofold: qualitative, to know exactly what we have, and quantitatively, to know the dimensions of the system.

Doing so we will have a clear picture:

· the resources that we possess or we need, with all their characteristics and their origin.

· waste production within the system or in its neightborhood.

· what happens in detail in those processes taken into account.

According to a systemic approach to this initial step of the critical issues emerge very clearly caused by the behavioral model or the linear model of consumption currently required. With the systemic approach these flows will be reorganize, optimizing resource usage and giving more value to waste. These wastes can be reused by other processes, existing or newly fallen into this reality. Alongside the new processes will arise and new relationships and

consolidate the new system will take shape following the house rules of systemic approach. The actual design of electrical instruments will be only part in this complex landscape. Each instrument will be deeply analyzed:
· on one hand from a systemic approach (taking into account the processes carried out, resources used, flows involved, relationships formed and waste products)
· on the other hand the functional analysis (a basic schema of the functions will be designed, it describes exactly the steps that the tool addresses to perform the function for which he is appointed. The schema will then be critisized if that is the most strategic in our system, to perform the function in question).

Also in this case will emerge critical aspects and new design concept.

The designer has thus constructed a general map of the points on which to intervene. Then lowering the spatial characterization to which the system will attempt to reconcile his house guidelines contextualizing the project in all respects.

Networks in that area identify its resources, the know-how of who lives and material culture in its history, will influence the decisions of the designer by offering new opportunities and establishing a strong link with the territory.

The great effort made to account for so many and so many dynamic parameters will be repaid by the fact that the only way the designer can truly understand the consequences that will result in environmental, social and cultural.

To return to our refrigerator, we see that the existence of this instrument for the preservation of foods, as well as we can see today, is being challenged in several respects.

From a design process of such features, based on systemic, will arrive to have a new method of preservation that may not have anything to do with the traditional refrigerator.

Will consider first of all what must be preserved, its origin from the surrounding area, what time of year is and how you can keep trying to exploit the resources offered by that place, as the temperature due to climate or alternative energy sources if necessary. In addition, this new tool will develop according to the relation with the user, and will enhance respect the needs and behaviors of people who inhabit the territory, favoring their uses and customs.

If it takes resources in a synergistic way with other instruments in the Home system, adopting a dialogue and dynamics to optimize these resources, fully exploiting what touches as input and avoiding creating useless waste to be disposed of for other processes in the system.

THE EFFECTS OF THE PROJECT

The impact on the territory by this kind of approach will be several:
· Integration in the context that respects and facilitates binding to the food from the region will promote the natural cycle of the agro-food chains and independent rhythms become stressed to deal with big production to export beyond the borders.

· Respect and reinforcement of the cultural aspects of the production site will be kept in view, because if a tool is directly related with the human subject, then the most suitable labor to produce it will come directly from the know-how that territory and draw on the information most useful to the production by the real material culture.

· Thereby encouraging economies of scale will prevent problems in advance to the expansion of logistics and the laws of the market.

· New production logic will take place, to produce cheaper and better, actually using the resources you have available on site, without stressing the environmental balance, and turning to a consumer audience that will be reduced to that territory.

· Doing so the quality of any product shouldn't need to be communicated, and will prevent all that is influenced at the level of consumption driven. In contrast the quality of a product will be directly guaranteed by membership in the chain of that place, which remains under the eyes of all subjects of the territory, if something is not satisfied with the consumer, he can play a direct control.

· Finally, all these aspects will increase the level of welfare and health in that particular place so as to utilize everything that revolves around the trio *food - health - territory* whose importance today, is becoming crucial.

The most interesting aspect of this new perspective is that we are ready to adopt it: no need for a technological effort or economic issues. It is sufficient that the man realizes that things can not go forward, looking around with an adequate level of information will not be hard to find that we too are part of a complex network, the fragile balance, but not yet completely compromised.

Currently we are sure that preclude these equilibria for profit's sake is not useful at all.

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SYSTEMIC APPROACH APPLIED TO PRISONS

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The focus of the research is the application of systemic design in a complex environment: the Distric Prison Lorusso and Cotugno in Turin.

After a careful analysis of the current situation about flows of materiall and energy, I have started the exploitation of output. In this way, with the cooperation of cooperatives already active inside the prison and the same prisoners, new frontiers are possible with the use of what was once considered waste and now becomes a resource; what was used for landfill and represented a social cost is now becoming something valuable.

There are new activities foreseen in the research: running a biodigester, farms raising pigs, hens, frogs, fish, snails, a vegetable garden, the production of worms for composting, cultivation of mushrooms and production of honey, candles and soap. The results of these activities do not only cover the needs of the prison but part of the products will also be sold to make an useful earning for further investments.

The economic advantages are therefore evident: assessing costs and revenues for new activities, they are clearly sustainable in the brief and long term. Furthermore, the creation of new spaces to manage involves the creation of unexisting professions, regarding not only earnings, but also training. This is a foundamental point as it allows the prisoners to mature inside the prison, to create an alternative and to exploit this period as a moment in which they understand they are part of society. It is a new responsability based on cooperation, but most of all, on the link with the territory.

Considering the selfproduction of food, we can pass to a menu called "Systemic" that maintains the quantity nutrients in food and also uses the products of those new activities. The systemic menu will be diversified according to seasons and availability of raw material, and aims to reduce even more the waste of energy and materials in the kitchen.

If we consider the jail as an integrating part of our society, as part of the system based on exchanges and relations between responsible parties, then it will be easy to understand how this can become an excellent example, for once, for the first time, to follow.

••• Systemic Approach, Systemic Menu, Jail, output-input •••

SYSTEMIC APPROACH APPLIED TO JAILS

The jail is undeniably a particular context to which designers, so as many other professionals, don't frequently approach. It is a reality very far from us, to which we seldom think and consider is with detachment, indifference and disinterest.

The opportunity to know the prison came to me from the 15th to 20th of February 2010 when I attended to the workshop "a second life" held by Silvia Braga of the Papili Factory Onlus s.c.s. The cooperative was born in 2007 with the purpose of human promoting and social integration of disadvantaged citizens.

The proposal was the design and construction of items using recycled materials. What has piqued my interest when I chose to enroll in this short course was the prospect of working together with the women's section held the prison "Lorusso and Cutugo" of Turin, perhaps best known as the "Prison of Vallette ". The workshop was held in the tailor laboratory of the prison. Staying in close contact, even if only for a few days, with some prisoners allowed me the privilege to hear the stories of alienation, despair, abandonment, but also chains of unfortunate life choices due to lack of resources (economic, cultural and affective) which inevitably led to the condemnation of a sentence to be served within the walls of a cell.

The thing that struck me immediately entering the jail is that the prisoners are only some of those who live in this community, complex and articulated, if not more than the broad one in which we live, citizens set free. Each person has his role and the hierarchical structure, not only between operators and imprisoned, but among the prisoners themselves, is very strong even if not easily accessible and understandable to "external" people). What hit me and that I strongly urge to believe in the importance of a project dedicated to actively involving the prisoners was a reflection made on this occasion. Despite my experience in the jail has represented only a very brief parenthesis, it was enough to realize how difficult it is to associate the principle of re-education to what is the daily routine of jail.

The Article 27, paragraph III of the Italian Constitution also provides that the penalties should be aimed at rehabilitation of the offender, so that the problem of the purposes of punishment becomes, in our system, a constitutional order of relevance. "Punishment can not consist in treatment contrary to the dignity and must aim at rehabilitating the condemned" (Fiandaca and Pizzorusso, 1991).

The restriction of rights and the inability to escape from the jail is a necessary sentence to be served under the law, but the obligation to remain prisoners in a cell of a few square meters with the grant to have an hour of air once or twice a day is something different. In a context like his, it is hard to imagine how a rehabilitation process can work with an easier reintegration into society. Having 22 hours on 24 a day in a cell, often overcrowded. This is what serving a sentence in a jail means.

The women at whose side I had the opportunity to spend those few days were and felt really a privilege respect to their companions. They had the opportunity to work, express

their creativity, in a certain way to have a role and a well defined active function. A job, most of all when , as in this case, it is a creative activity, can mean identity. It's not just, as you might think, a way to spend time and to speed through the hours of the day, but a system to react, to show that they are useful to others and to themselves. For these women, working in the laboratory, that simple tailoring, represented the most important thing in jail, as if it were a real mission.

But my job is mainly constituted by the examination of the jail general kitchen intended to prepare the daily meals for about 1500 prisoners. This is an extremely complex reality, which records the high consumption of resources (water and energy) and which is entrusted with the management of huge amounts of raw materials.

The development of my work starts from the project carried out by students of Open Systems Module by Professor Luigi Bistagnino during the year 2010-2011 of the Master in Ecodesign. The project essentially consists in evaluating the current situation in the kitchen and then attempting to figure out how to exploit the potential from the development of outputs, now regarded as waste destined to landfill, but in reality can be the raw material and the starting point to run new activities.

Starting from the menu, dictated by the Ministry of Health, the students have gone back to the main actions carried out in the kitchen to be able to precisely define inputs and outputs, not only the quantity but also and above all the quality. Starting from the available outputs it was possible to envisage a series of new activities to be undertaken within the jail itself or to link with other existing systems (think of the various cooperatives in the jail, such as the carpentry or the Papili laboratory). So we have outlined new systems in balance and totally interdependent and self-generated. The planned activities are numerous:
· a biodigester
· a composter
· mushrooms cultivation
· breeding frogs
· fish farming
· breeding hens
· breeding worms
· pig farming
· production of soap
· vegetable garden
· orchard
· production of honey
· arboriculture

The assumptions made in this way could be described as the best imaginable. Inside the jail, however, there are many practical difficulties induced by the slow and cumbersome bureaucratic processes which must be considered in a project so extensive and widespread.

From my point of view, the more thorough review of each activity was essential, for example reducing the number of livestock in the case of farms or of the square footage available for the vegetable garden and other crops. The selection of some of the activities proposed as feasible within the jail, was also essential.

It was then interesting to analyze how the application of the systemic approach could make fundamental changes and improvements regarding the prisoner that, actively involved in the birth and growth of a virtuous system, would, perhaps for the first time, have the opportunity to become aware of belonging to a social group. He would learn to respect, but also to appreciate, rules and principles and would result in a deep awareness and a sense of responsibility especially thanks to the relationships that would be created. Active employment of time in the jail is essential to counter the sense of uselessness and idleness, to prevent the risk of re-offending and to build an effective bridge between prison and territory (Buffa, 2011).

My initial goal was not ambitious to the point of aim at an improvement of the condition of prisoners within the prison or outside, once finished the sentence to be served. But in an attempt to make the best use of resources and raw materials, to apply a systemic approach in a complex contest and cumbersome as that one of the jail, it is easy to see how a beneficial change for the prisoner is possible.

ACTUAL ANALYSIS

As briefly advanced in the introduction, it was first necessary to analyze deeply the input and output regarding the general kitchen. To help this operation, the main actions performed inside a kitchen are take into consideration. These actions basically regard 2 activities: the preparation and cooking of food.

During the preparation we must consider that the variety of food goes through various and separate routes and crosses different and separate environments. The preparation of meat, for example, is handled separately from fish or other food. The actions related to the preparation of food are washing, peeling and cutting vegetables and fruit, unfreezing fish and cutting meat. To the cooking are instead related to boiling vegetables, meat, eggs, rice and pasta, strictly controlled separately because inputs and outputs are much different, grilling meat and vegetables, stewing meat, vegetables and fish and baking vegetables, meat and fish.

In order to determine the quantity of food input, the menu of the Ministry of Health, drawn up according to meal schedules approved by the Ministerial order (art. 9 Ordinamento Penitenziario) generally including a first course, main course and side dish, has been examined. Many prisoners eat only part of the food distributed by the administration and buy food themselves and other commodities (soap, stationery, cigarettes) by the "sopravitto" (the store run directly by the prison administration).

All jails on the Italian territory necessarily have to follow the above menu, without any variation, except for prisoners with particular dietary needs for health and religion.

Having a predefined menu helps the cooks to work in the jail kitchens because they don't have to worry about determining a proper menu for prisoners, but they don't take any decision about it.

Since inside the kitchen of the Lorusso and Cutugno Jail there are, besides 3 professional cooks, also 22 prisoners, it could be interesting for them to be involved in determining the menu. This would allow to respect the characteristics of the territory in which they are situated.

From January 2005, the central kitchen of the jail "Le Vallette" is run by the cooperative Ecosol of the Union of Social Cooperative Kairos. The meals are prepared by 3 professional cooks and by 22 prisoners employed by the same cooperative which applies the CCNL (Contratto Collettivo Nazionale di Lavoro). This means creating real jobs inside the jail and represents an actual possibility offered to prisoners during the rehabilitation that our regulations confer to a sentence.

In order to understand the various actions inside the kitchen, it was useful to examine the route food takes from the arrival in the institute to the cells. The supply of food goes on every day and while the stockage is divided in 2 different places: vegetables, fruit, pasta, rice, drinks, bread and seasonings as oil, vinegar, salt and spices are sent to a store at room temperature. Meat, frozen fish, milk, cheese and eggs as food easily perishable must be kept in a cold store. Fruit and vegetables, which are about the 21 % and 25% of the input of food in the institute, are subject to a sort of previous processing before the real work. So it is necessary to remove with care rotten parts or waste destined to organic waste. If the quantity of vegetables is 266.224 kg per year, of fruit 226.800 kg per year, as for what regards the waste, only at the selecting stage, we reach 66.556 kg of rotten vegetables or waste and 11.340 kg of rotten fruit per year. These numbers are useful to understand the enormous quantity of raw material managed by the kitchen.

After the selection of fruit and vegetables, the real preparing treatment and washing start and this means a big deal of drinkable water. It is difficult to measure exactly the litres of drinkable water used at this stage because an existing law obliges, as for what regards kitchen and canteens in hospitals or the like, the use of running water to wash fruit and vegetables. It means about 100.000 litres per week. The interesting thing is that the grey waters in exit are destined completely to drainage with black waters. The grey waters coming from washing vegetables have interesting characteristics: they contain organic waste and insects.

As whole fruit is served at the end of the meal, according to the Ministry menu, it doesn't have to be peeled or cut, so this only concerns vegetables. The output of this action is represented by peels and leaves destined to organic waste. We musn't forget that at this stage the waste is clean after being washed. The vegetables in output, selected, cleaned, washed and cut are destined to being grilled, cooked in the oven, boiled and stewed. As for what regards meat instead, it arrives in the institute already partially worked. The parts of beef

are previously cut to help the work in the kitchen. Roast, bone steak, boiled meat and braised meat, sliced meat and minced meat, come from the beef. Rabbit goes to the kitchen headless and eviscerated, chicken in breasts, legs, quarters and wurstel. Pork is in the menu as minced meat, pulp and sausages. Then the meat is cut and prepared for cooking. The main output after cutting is fat destined, as other waste, to organic refuse. This means over 26.000 kg of fat every year.

After the preparation, the vegetables cleaned and cut go to the cooking. Each step examined separately shows that the biggest part of the vegetables and nearly half of the potatoes are boiled. The quantity of drinkable water used for this operation is 4.200 litres per week and after this operation and the cooking, is destined to the drainpipes. Baking is the second way to cook vegetables. If in the inputs, besides the raw material we have also the electric energy, the only output is the consequent production of CO_2 deriving from the use of the oven. Vegetables are also grilled and stewed and the latter produces another input respect to grilling: drinkable water, even if reduced respect to the need for boiling. As for what regards meat, after cutting it goes through boiling, baking and grilling, while instead fish, which reaches the jail only frozen at the best, or in cans, is cooked in oven or pan. Pasta and rice have to be boiled, but the pasta can also be prepared and cooked in the oven as for "lasagne".

Although the ministry menu has some disadvantages like being imposed from the top and doesn't so respect territory productions besides not considering that a big part of prisoners have a different culture, at the Vallette jail, where the foreigners are about the 70%, the menu is rich and varied. It is intended for all Italian prisons and with a different version for summer and winter. It also turns over 4 weeks. The contract signed by the Union with the jail management foresees the payment of a coin for each day in which food is prepared(breakfast, lunch, dinner). So the cooperative will have a coin a day for each prisoner inside the institute. The coin is equivalent to 1,48 Ð, excluding foodstuffs supplied by an external firm.

There are some critical about the supplying company. The firm that won the tender serves all the prisons on the national territory, with a sort of monopoly. There are 3 regional resolutions of the Auditors for Veneto, Umbria and Lombardia and a mention from the Authority for competition in 2010, questioning this way of awarding a tender by private auction.

Unlike a public auction, the supply of food for jails is a tender upon invitations, not open to all those interested who respect the necessary qualifications. Furthermore it seems that the winner is always the same one Eredi di Arturo Berselli Arturo Berselli e C. spa.

The current approach, the method used so far and just described, is called "linear". If is true that the model that I wrote about in the previous chapter has implemented efficiency measures, it is also true that it generates a large amount of waste. It's important to remember that this waste, that is now fully destined to the landfill, is not only a considerable social cost, but also a waste of material. The waste, especially in a context such as the kitchen,

has some very interesting and often useful features as inputs for various livestock or crops, but many times even for ourselves.

We will see analyzing action after action that there are now outputs that inevitably end up in the sewer but they are usable in the same kitchen for the preparation of other dishes, to enable their exchange. This necessarily requires a more careful and elaborate design of the menu. But this is a next step that needs a deeper analysis of the various tasks within the kitchen and, above all, of critical issues that affect them. Starting from the activities relating to the preparation of food, those that precede the actual cooking, we can say that in general, the waste that characterizes this stage are mainly raw organic parts, though there are differences depending on the action.

The first action, namely the washing of fruits and vegetables, implies, as mentioned previously, the use of a large amount of water as "the washing of the vegetables should be done with running water for a reasonable time". The food sector operates in an environment characterized by the legislative framework developed in the European Community and later incorporated in the national field.

In this context an important position is occupied by the Directive 93/43 on the hygiene of foodstuffs. Hence the requirement for companies to establish a system of prevention of risks for consumer health. This procedure is difficult to modify because it belongs to a system of rules aiming to the establishment of management procedures to ensure that all activities of the process of preparing and distribution of meals are such as to maximize the risk reduction.

In the action "washing vegetables and fruit" there are other critical issues on which it would probably be easier to act. Let's see the features on the water outlet. It has residual organic parts containing vitamins and minerals but also parts of soil remaining on the vegetables during the harvest. Since the rule is to use running water today it's not conserved but it's sent directly to the sewer. For the presence of soil residues, water output could not be reused in the kitchen to prepare other meals but it would be possible to think of a reuse for washing the kitchen. The critical aspect is related to the fact that the water is fed into a flew in which is fed also gray water with detergents and black water resulting the inevitable contamination of the water from the washing of vegetables not contaminated at the beginning. The clean vegetables are sent at this point to the peeling and cutting. The output after this step has very interesting features as we talk about peels and outer leaves previously washed and cleaned. If it is difficult to think of a use for the preparation of other dishes, , it is instead possible to imagine that they become inputs for the production of compost or feed small farms. The rejected parties contain vitamins, carotene, retinol, iron, potassium and other nutrients. The processing of fish and meat is mostly the cut. As for the fish, since it comes totally frozen and pre-treated, it does not require much work and, therefore, it does not involve the production of much waste since the fish is already deprived of bones, tail and head. The meat that arrives cut in pieces, needs instead to be more processed, this

causes the production of waste, mainly of fat. We speak approximately of 26,000 kg of fat per year which completely end up in the organic waste.

Let us now go to the actions in the second phase, the one that follows the preparation, the cooking. The boiling of vegetables has an output of 208,000 liters of water mixed with vitamins, minerals, fibers and salt. The outlet water is very interesting because, besides containing many nutrients and being completely edible, it has a temperature of about 90 ° C. If it's reused to cook other dishes, it does not require heat to reach the boiling point. We must also consider the fact that water, being already in contact with vegetables and salt, does not require the use of soup cube to increase the taste. It is the same for the action of boiling other foods such as potatoes, meat and fish.

For what concerns pasta and rice the water in output has an additional element, the starch. The transformation of raw starch in the boiling water is called gelatinization: the starch granules swell and burst, forming a paste. The starch has very interesting features: it is good to change the consistency of many industrial or domestic foods (as, for example, wheat or corn flour used to thicken sauces), but has been used for centuries for other purposes, including the production of paper (gluing) and glue. Today new applications of starch are emerging, including dietary fiber, biodegradable packaging materials, films and ther⁄moplastic materials (Imberty and Pérez, 1988). These applications, as you can imagine, involve very complex processes, but starch is also useful, more simply, as a degreaser. We must consider the need of a filtration pre⁄treatment in order to convert the starch in the pasta waste water into starch usefull for different purposes. It 'also possible to use the full output of the pasta or rice boiling (hot water ⁄ starch ⁄ pasta or rice scraps) as source for small chickens , pigs or fish breedings or even, after a simple filtration to remove parts of waste, such as irrigation water and fertilizer for plants and flowers.

The remaining actions of cooking for meat, vegetables and fish, the steaming, baking and grilling, do not provide the consistent production of outputs. It 'necessary to specify that in the general kitchen of the institute there is no frying, as the menu does not have any fried food.

If it is true that any minimal change on the entering food would be difficult precisely because of the fact that an outside company, winner of a national contract, deals with the distribution of the raw material, it is easy to think of a reuse, when possible, or of other use of outputs, today destined to the landfill, if solid waste, and to the sewage, if liquids.

To sum up, the main outputs from the kitchen of the jail with a linear approach like the actual one can be identified as destined to the sewer (water containing, according to the actions, soil residues , small insects, vitamins, minerals, fiber, salt, pasta or rice starch, fat and proteins, food residues and detergents) or organic waste (leaves and outer peels, egg shells, fish or meat scraps, fat, pasta or rice residues). There are also further waste from the various packaging destined respectively to the collection of paper, plastic, glass and cans. The alternative use or the reuse of outputs from the kitchen of the Vallette institute is

important not only because there are different sector of application to investigate at this purpose, but also because the management of the jail general kitchen, which, as anticipated work for about 1500 prisoners, involves the treatment of a big amount of food. The volume of treated food allows us to think about the development of other systems apart from the kitchen but closely related to it.

The kitchen inside the jail does not work only for prisoners. The cooperative Ecosol in 2007 initiated the project Liberamensa with which it offers catering services and gastronomic dishes fully prepared and packaged in the kitchen of the jail Lorusso and Cutugno. The service deals with the realization of banquets, buffets and coffee breaks for ceremonies, presentations and conferences. The catering kitchen, adjacent to the general one, is not subject to the restrictions to which the general kitchen is. The supply of raw material is chosen from the same cooperative that has no constraints of any kind. In the kitchen of the catering are employed 14 workers: 1 warehouse, 1 employee to packaging, 1 employee to wash, 1 the production of pizzas and sandwiches, 3 bakers, 2 to catering, 2 to the bar, 1 for refugees and 2 employees for the organization of catering. Within the institute the catering primarily works for staff working within the jail by providing lunch for five days a week. The menu, which changes every week, offers three first courses, three second courses, usually one or two meat dishes and one vegetarian, and a choice of fruit, yogurt or desserts prepared by pastry chefs employed by the cooperative. It was necessary to do a thorough analysis of this part of the kitchen, splitting each action held in the kitchen. It's easy to imagine how the actions are similar to those that characterize the general kitchen, but as the dishes are more elaborated, there are more operations as for example frying. This cooking method, although it is not used very frequently, involves the production of an output that, after a careful observation, is very interesting: the used oil.

SYSTEMIC APPROACH

A deep consideration of the current situation allows to face the project, with a clear and detailed picture and to step in with efficient measures. Determine clearly the sequence of every single action and the flow of materials and energy is the starting point, necessary to go on with the systemic approach. It is essential to describe what enters in the system or better, the input, to know where it comes from, the transformation within the action, but also the output of that action. The analysis of input and output cannot only regard the quantity, even if basic, but must also consider the quality aspect to enable to identify the intrinsic properties of the input and output. Only in this way it is possible to understand what we really dispose of and the final destination of the different outputs. The provenience is important too, not only of the raw materials but also of energy resources.

Since we are speaking about the systemic approach and open systems, it is necessary to examine the provenience of the inputs to clear what moves downstream the request and the retrieval of a certain resource. To show the reliability of what we state, here are a few

examples, belonging to different background of products which pretend to be "ecological" for the final user, but use raw materials very difficult to obtain. We can say that the desire and will to contribute to sustainability sometimes represents and opposition to a true change, a change of behavior and mind. We can think about promotion by Europe in 2006 on behalf of bio-fuels which meant an enormous request of raw materials competing with the production of corn for food. The first consequence was the increase of the price of corn that represents the basic food for developing countries. The risk was food safety for those countries. The United Nations had to intervene to discourage the use of corn and palm oil for the production of bio-fuels (Pauli, 2010). The example of bio fuels, although it represents a different context than that of the systemic approach and, most of all, of the project developed in the Vallette prison, is fit to understand the importance of an analysis under present conditions and, at the same time, accurate and wide to know reasons and consequences related to our project, even if not immediately evident. Instead a superficial analysis allows us , not only to enter the problem deeply, but also can stray us away from the real critical points.

The step that follows the current relief is simply a change of point of view and investigation. It means to consider that what now represents waste, something to remove, something useless, can become a value. So again it can be considered raw material, simply changing point of view. Not necessarily the output examined must be reused in the same way; in fact, this happens rarely, so as in nature these can become raw material useful to other animals or subjects of other kingdoms. The parallel drawn with the natural kingdom isn't random, nor a nonsense.

The systemic approach is frequently applied to the natural world not only in an attempt to understand the efficiency of materials and proceedings, but also and first of all to understand the complexity and need of relations. Relations that make the base, the net that Fritjof Capra calls "the net of life" and that determines the same system (Capra, 1997).

We look at natural systems not only to obtain indications and solutions but also because we depend on their preservation and good functioning. Each single system is in a tight relationship of correlation with its similar and with the entire system. It is so simple to understand but difficult to realize. The figures that must be considered during the project are many and often touch various and different ranges that can only be examined by external specialists. This is another interesting aspect of the systemic approach: it's not possible to create and exhaustive project, without the cooperation of figures coming from different worlds, in this way we would be designers of a product, a service or system unfinished and disjointed and so not practicable or at least not with the results prognosticated in the project.

After the first step, or better, after having transformed the outputs of a system in the inputs of another, we can see the consequent generation of new relations that can be internal and external to the same system. We must devote to these connections between the actors a

particular attention because they are not only part of the same system. Considering the context in which the project on prisons develops, the importance of the relations born on account of the exchanges of materials and energy has important remark. The knowledge and assumption of responsibility are aspects that touch deeply the prisoners and play a fundamental role in recuperation and reinstatement in the same society. The exchange of output between different systems or inside the system and the following growing up of new relations determine and characterize the territory that doesn't only represent the context but also identifies the characteristics and quality. Working on these two aspects, it is clear that new economic activities can arise, in a certain way virtuous because they focus on man in his environment, social, cultural and ethic. The consequent economic aspect in applying the systemic approach, is fundamental, most of all due to the critic, historical moment we are living. "The economical and environmental crisis are two aspects of the same phenomenon. The center of their nasty functioning is the same ethic problem The preference for the present and its corollary and the depreciation for the future. In this tension between long and short term is the deep bond between financial and ecological crisis." (Fitoussi, 2009) Giving a value to what, until today was considered waste, means saving the cost of dismission and digesting in the purchase of new raw material for other activities, but also the possibility of making profit from generating new activities.

The final purpose would be the creation of new profitable activities and the use of food produced in this way, inside the general jail kitchen. So the prisoners could stand to gain the result of their work. As said before, the prison must follow strict politic bureaucratic rules, difficult to modify. The paradox is that the general kitchen destined to prisoners wouldn't be able to use what produced inside the prison. This is the reason why this systemic project foresees the passage of the kitchen output as a catering, not under the same rules. Thanks to the use of the output of both the kitchens, a mushroom bed can arise, or a space for the production of compost for a vegetable garden, a small hen-house to which some organic waste could be destined, or a fish growing trough and a wetland plant. Food produced thanks to these new activities could be used in the catering kitchen and eventually can be part of a new menu which uses at the best, the resources produced by the institute, besides studying the organization of the dishes looking forward to saving energy and raw materials.

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THE LANDFILL NEAR BRASILIA.
FROM A PROBLEM TO AN OPPORTUNITY FOR DEVELOPMENT

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Nowadays garbage can be considered as an indicator of the habits of consumption of the society we live in. The problem is rising up all over the world, in particular in a strong growing economy such as the Brazilian one. The composition of waste shows that the citizenship does not recognize the environmental and economic problems linked to the production of goods that are generally buried.

The object of the analysis is the landfill near Brasilia, next to the slum called Estrutural. Here the *catadores*, in independent groups, choose the recyclable wastes bare-handed and separate out the materials in order to sell them, through the cooperatives, to the recycling companies. The actors in the systems are not linked: on one hand the citizen ignores the effects of the wastes, on the other hand the *catador* lives in the slums and works in difficult conditions, socially excluded.

It is necessary for the Brazilian institutions to understand that by changing the approach in waste management the territory can grow.

••• Catadores, landfill, separate waste collection, environmental and social resources •••

Up to this day, in industrial societies, the perception of attaining economic growth has been connected with the increasing accessibility to material goods, involving the blind use of natural resources. As a matter of fact, nowadays garbage can be considered as an indicator of the consumptive habits of the society we live in. Garbage reveals what and how much we are consuming. This same consumerist drives us to get rid of the goods, throwing them away without understanding the consequences of our actions. The message we are submitted are clear: if we consider the situation of a Brazilian citizen it is possible to notice that he is pressed to the infinite purchasing, spread by North American lifestyle[1].

The problem is going on all over the world, particularly in a strong rising economy such

[1] Lanzavecchia, C. (2004). *Il fare ecologico. Il prodotto industriale e i suoi requisiti ambientali.* Torino: Time&Mind.

as the Brazil. The composition of wastes in Brazil shows that the citizens do not recognize the environmental and economic problems linked to the fact that production of some Brazilian goods are currently first buried in trash. The solution is to break down the current link given between the perception of welfare, available goods and the consumption of resources. It is clear that in order to face directly and as a whole the problem of cohabitation between humans and the environment, integrative strategies are needed to be shared worldwide. Everyone will need to be able to take charge of their own responsibilities that for example would include a new environmental consciousness of the environmental impact our own lifestyles, from citizens and institutions.

The situation of the waste in a developing country such as Brazil is nearly the same as the waste situation in the poorest countries of the world. Brasilia is the young capital born about 60 years ago from Lucio Costa's project to build an administrative capital to populate the centre of the country. Everything in Brasilia has been designed even the waste management system.

According to the data collected by SLU[2] (Serviço de Limpeza Urbana) every months 59.078 tons of wastes are collected by the company charged, 98% of which comes from mixed waste collection, 2% from separate of waste collection. The composition of waste shows that there is a huge presence of the organic compound 48%, that shows that citizen doesn't pay attention to the consumption and production of food waste, while at the same time in the landfill unfortunate people look for food digging through wastes.
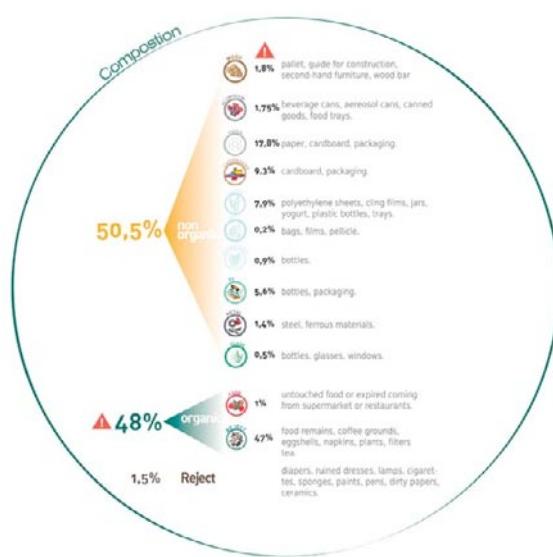
FIG. 1: WASTE COMPOSITION.

[2] Diagnostico SLU, *Plano Gerenciamento dos Residuos Solidos no DF*, 2008.

The waste system is managed by the local government which is in charge of collecting, transporting, and processing waste before final disposal[3]. The garbage collected arrives at the processing works; organic compounds are separated from the non organic. After the reduction of the volumes, the separated waste is sent to the landfill. Because some garbage processing sites cannot handle all the mixed garbage they receive, any mixed waste the site was unable to separate is also sent to the landfill to be buried. At the landfill there are about 3.160 *catadores*, groups of independent people who work bare-handed in the landfill collecting recyclable wastes and separating out the materials in order to sell them. They live in the slum located next to the landfill, in poverty. Alienation, illiteracy, child labour, crimes between groups, death because of diseases coming from dangerous or sharpened wastes are the problems related to these poorest of persons, who are often forsaken by so-ciety. The *catadores* survive by collecting the wastes they find in the landfill. They give them an economic value and they can sell the recyclable materials in accordance with the cooperatives, that give back to the *catadores* a percentage on the sold material as salary. This informal monthly salary pay them for the job, which is not sufficient for them to survive. Cooperatives are made by ex *catadores*, joined in groups, that sell to the recycling company the materials. They own a basic fix capital, such as trucks and basic instruments, but ba-sically they rely on the *catadores*, with the percentage of money they take on the materials. Recycling materials is sold in accordance with the cooperatives to the specified recycling company (plastic recycling company, paper recycling company, foundry), to reintroduce them into the productive processes. The problem is that they need cooperatives trucks to sell the materials, and yet, they work is not protected by law. The local government is aware of the conditions of the *catadores*, but prefers to hide them to the citizens, who con-tinue to ignore the social problems related with the waste disposal. In economic terms, the amount of wastes produce important consequences on society: each phase of the manage-ment process has a cost that drops on the citizens[4]. In fact, they pay monthly a garbage tax of about 5.400.000 R$ that covers only half of the management costs. The rest is covered by internal money transfers from other taxes (about 5.600.000 R$) made by the local govern-ment[5]. In this way, the citizen ignores the real costs of garbage and of the simple action of throwing it away. The *catadores*, instead, by selecting in the landfill, are saving materials, earning money for reintroducing the materials into the productive chain, instead of bury-ing them. Even though their action is extremely positive, they remain hidden from society, because of their poverty and the consequent situations of criminality in which they live[6].

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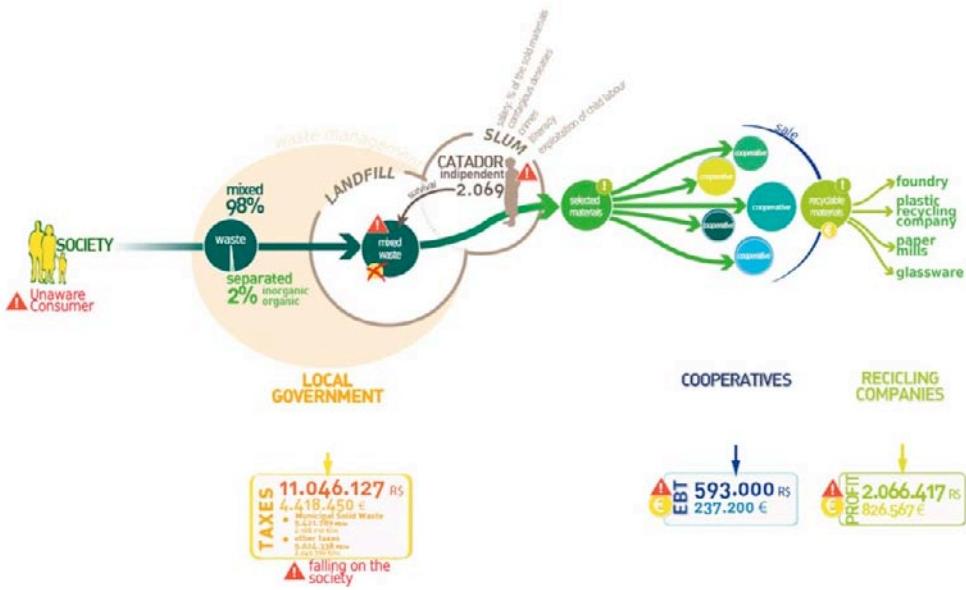
FIG. 2: STATE OF THE ART.

The data showed and the state of the art allowed to realize the context of analysis in order to figure out properly the problems related to the *catadores* actions and the waste management system. They have a value on society that nowadays, Brazil is not able to recognize it because of citizens ignorance on social and environmental issues[7]. The linear logic of the waste management system, as we analyzed, creates key lacks on environmental, social and economic field. Innovation and growth in this area is hard if local stakeholders continue to come up to this problem in a linear way. It is necessary, thus, a change in approaching the problem in a systemic methodology, in order to underline the relationships between stakeholders and their consequences, step by step[8].

A different approach allows us to perceive the main problem, the organic part of the wastes (all kinds of food wastes). In the mixed waste collection the organic part dirties the garbage making more difficult the selection of recyclable materials, because less quantity can be separated. Thus, few materials are collected and have low quality. It would be interesting to act at the beginning of the waste chain system, separating out the organic part from the recyclable one. This would mean a simple conscious action for Brasilia's citizens, because they are easily recognizable, in particular the organic part, could have higher quality to follow into organic compound processes. Because of its composition, the organic could be transformed into soil in order to produce other outputs (such as biogas for green

[7] Benvindo, A. Z. (2010). *A nomeação no processo de construção do catador como ator econômico e social*. Ph.D. Thesis in Ciências Sociais, Universidade de Brasília.

[7] Bistagnino, L. (2011). *Design sistemico*. Bra: Slow Food Editore.

energy coming from bio digester) with accurate investments. It is necessary for Brazilian institutions to understand that changing the approach of waste management the territory can grow. With the systemic methodology, we designed some scenarios of separate organic collection, which, at different level, show a relevant growth of local the area as the relationships of the stakeholders are rising, reinforcing and evolving.

The first step was made designing a scenario of separate organic waste for a 25%. To have a meaningful result in terms of separation of the waste from the citizen, a basic communication about the potential benefits of recycling has to be designed. This would be basic because a similar separation of urban solid waste is already achieved. It is necessary to get results that would increase the quantity of separate wastes, outreaching a largest number of citizens through investments of the municipality. The effort of the citizens would be vain without a correct strategy, made of accurate investments in a more efficient waste management system. The separated organic and recycling parts have a great potential. After the first separation made by more conscious society there are important relationships established. Together with the cooperatives, the local government invest in separating the recyclable materials mechanically, thanks to the efforts of the legalized hand work of the *catadores*. A triple cooperation between *catadores*, cooperatives and local government is established. Investments of the local government will be paid back thanks to a more efficient work of the ex-*catadores*. They now have a legalized job in a structured cooperative, that does no more exploit illegal work. More, a monthly fix pay for the job, more safe work positions as they moved from the landfill into the cooperatives and established mansions on the job. The number of the workers increase: we need 630 workers coming from the landfill. Few *catadores* remained into the landfill, while a great part has been employed. It is easy to understand that there will be more employment on recycling field. The production of recycling materials in this way has a significant increase and so the earnings on it, in spite of the costs. The investments made by the local government can be paid back simply thanks to the recycling materials sold by the cooperative to the recycling company. Earnings will cover the costs of the waste management and, as direct consequence, lower the taxes that is 5.422.000 R$ (-50%[9] taxes lowering with 90% allocated overheads from the cooperative to the municipality). In this way the whole community will notice the benefits coming both from the *catadores*' work, now transformed into officially cooperative workers, and from a systemic management of the waste.

[9] All the percentage are estimated referring to the data collected into the state of the art.
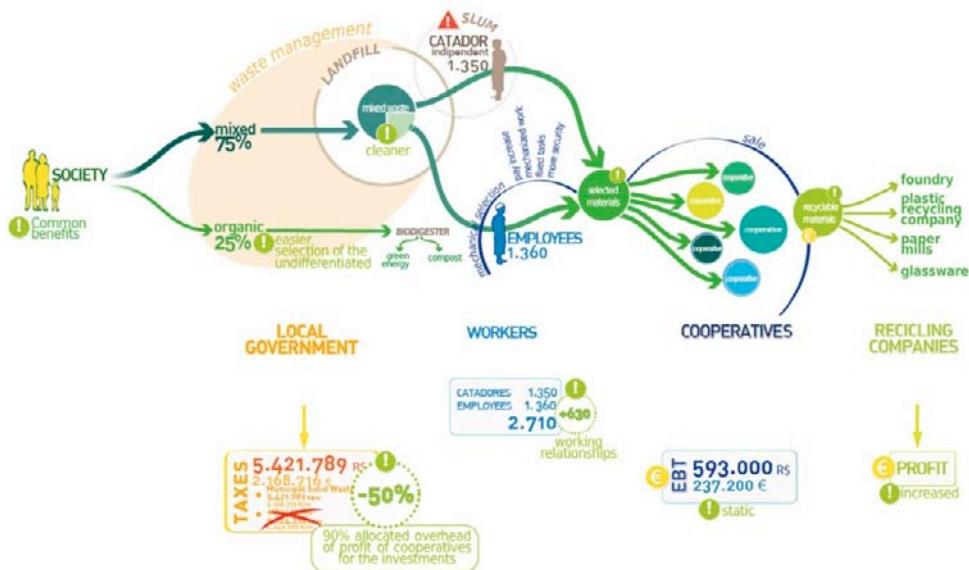
FIG. 3: ORGANIC SEPARATION 25%.

The scenario above shows that if the stakeholders in the territory start to cooperate between them, everybody would benefit from the positive relationships in a more connected urban textile. This would mean to abandon the linear logic, instead of the success of a systemic strategy that lead to an evolution of the stakeholders. This results lead to aware the citizens to separate the recycling materials at different levels. A further step can be designed with the addiction of the paper as separated material with a scenario of separate organic collection for a 25%. As the organic part, the paper is easily recognizable from the citizens. Then it is one of the most disposed waste in Brasilia (16% is the percentage of paper found in the waste composition[10]). This new level of organic and paper 25% collected, give results in terms of separation of the waste from the citizen and new benefits are goaled. The citizens see directly benefits and cooperate separating the paper too, as it is contaminated with the residual part of organic into the recyclable part. Through investments of the local municipality, the efforts of the citizens of having separated organic and paper give more resourceful potential. The organic part start to be an important point of investment for the municipality, as if processed into a local bio digester it may produce green energy for public lighting systems. This output will low other aspects to the fiscal pressing of the citizenship. Then, bio digester and cooperatives (paper and other recyclable materials) need more workers. We need 980 workers more than the previous step, increasing in this way the occupational levels. The cooperation established between *catadores*, cooperatives

[8] Serviço Limpieza Urbana-SLU (2008), *Plano Gerenciamento dos Residuos Solidos no DF.*

and local government continues and the investments of the local government are paid back thanks to the work of the ex-*catadores* and the new renewable resources they are investing into. Together with the cooperatives, the local government is called to invest in separating mechanically the paper in the cooperative charged to separate the paper, as it happened for the recycling waste. The investments made by the local government are paid back simply thanks to the materials sold by the cooperative to the recycling company. Earnings will cover costs of the waste management and directly low the taxes (-50% taxes lowering with 90% allocated overheads). With the separation of the organic and the paper at 25% taxes low furthermore, while the well-framed cooperatives draw up contracts with about 980 workers. It's easy to understand that the bigger is the quantity of separated waste, the higher are the economic benefits and the social dynamics moved. New benefits for the community have been reached.
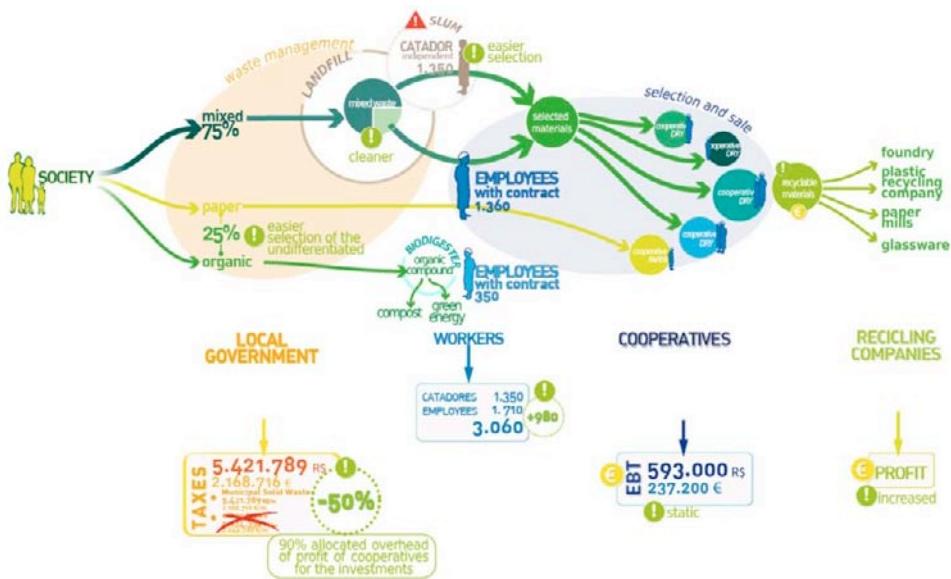
FIG. 4: ORGANIC AND PAPER 25% SEPARATED.

The scenarios presented showed how with cooperation, information and investments important results can be achieved. The central stakeholders of the evolution are the cooperatives, fundamental for the social growth of the *catadores*, at the heart of the local government investments. Also they are protagonists of a new consciousness spread between the citizenship, as the bigger is the quantity of separated waste the higher are the economic benefits and the social dynamics moved. For this reason, we designed scenarios starting from the previous one, considering their internal dynamics activated, simply increasing the quantity of waste separated at the beginning of the recyclable chain. We estimated the

consequences, in terms of evolution of the behaviour of the stakeholders with a clear accent on the new arising relationships.

Separating organic and paper on 40%, lead to employ more workers in the recycling chain (1.585 workers more than the state of the art) in cooperatives and in bio digester. This will transform higher quantities of good quality organic compound into green energy, to be used to cover public lighting costs of municipality. Higher quantities of recycling materials are going to be sell out as they have an higher quality, too. Cooperatives increase their earnings so that they will start to get money besides the 90% overheads they have to pay for the investments. So, if a lower percentage of separate organic collection allows to limit our field of investments, now, as finally the cooperative are receiving +17% (on the state of the art), they can decide to invest by their own to grow. A correct way to invest, partnered by the local government, would be in education inside the cooperative of the workers (ex-*catadores*) that have been employed. In this way they can increase the efficiency and the productivity of cooperatives, making qualified workers managing the processes of their jobs. The investments made by the local government can be paid back simply thanks to the recyclable materials sold by the cooperative to the recycling company. Earnings will cover the costs of the waste management and as direct consequence low the taxes that will be estimated 4.136.000 R$ (-63% taxes lowering with 90% allocated overheads). Local government is interested in decreasing the taxes and in maintaining the relationship started. In doing this it is necessary the cooperation of the citizens. The growing economic and social development benefits will be communicated to the citizenship. They will be informed about the benefits of the separate waste collection system, about the employment of the ex-*catadores* in this field, about new resources and outputs in which the government invested so that the citizenship can have a more trustful relationship with the government and the territory itself. Investments on public environmental education, communication and initiatives within different cooperatives are needed. At this point, more than direct economic benefits we have benefit in terms of education and effective relationship between the actors. The citizen starts to understand his central role in the complex system of input/output. In this way the whole community will see the benefits coming from the cooperation and evolution of the actors in the system.
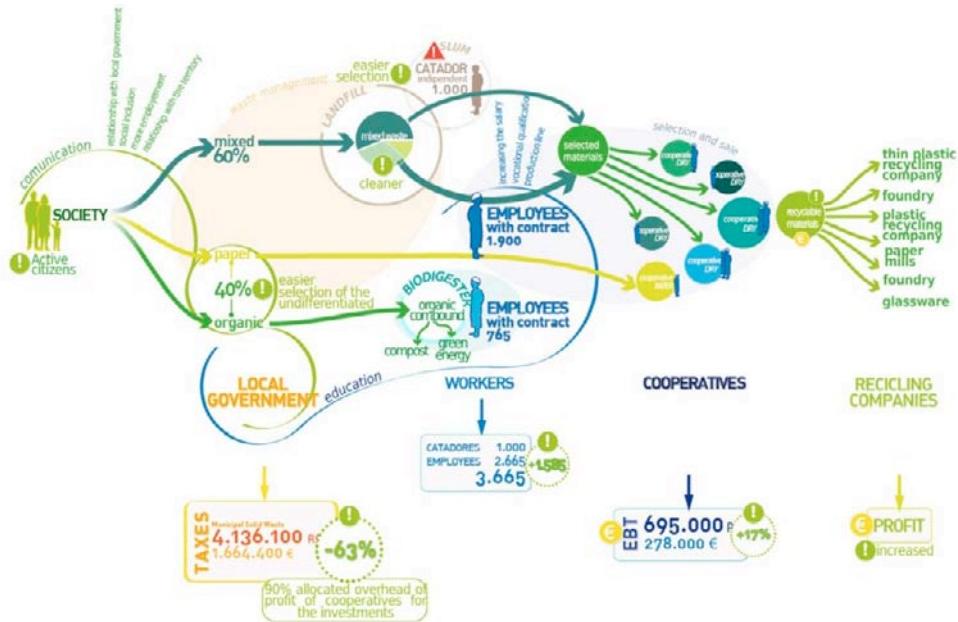
FIG. 5: ORGANIC AND PAPER 40% SEPARATED.

A scenario of 50% foresees a strengthening of the social consciousness of the value of the wastes and a specialization of workers into the cooperatives. The relationship activated previously are consolidating, efficiency and productivity distinguish the cooperatives, qualified workers are managing the processes on the job. The cooperative increase the incomes, now they are +29% than the state of the art. This earnings will cover the costs of the waste management and directly low the taxes that will be estimated 2.341.000 R$ (-79% taxes lowering with 90% allocated overheads). The higher profit allows the cooperatives to invest in research together with the local University, in new technologies and recycling processes in a systemic way. New technologies are going to be financed in the local university, thanks to the cooperatives and the government. The citizen finally understands his central role in the complex system of input/output and start to be active within these processes. Now he recognizes that garbage has a value that if properly considered, can give important results. Information, cooperation, actions are the best values that make the territory grow, starting from the Brazilian's homes and families.

In this way the community, as a whole, will see the benefits coming from the new values of the stakeholders acting in the systemic approach.
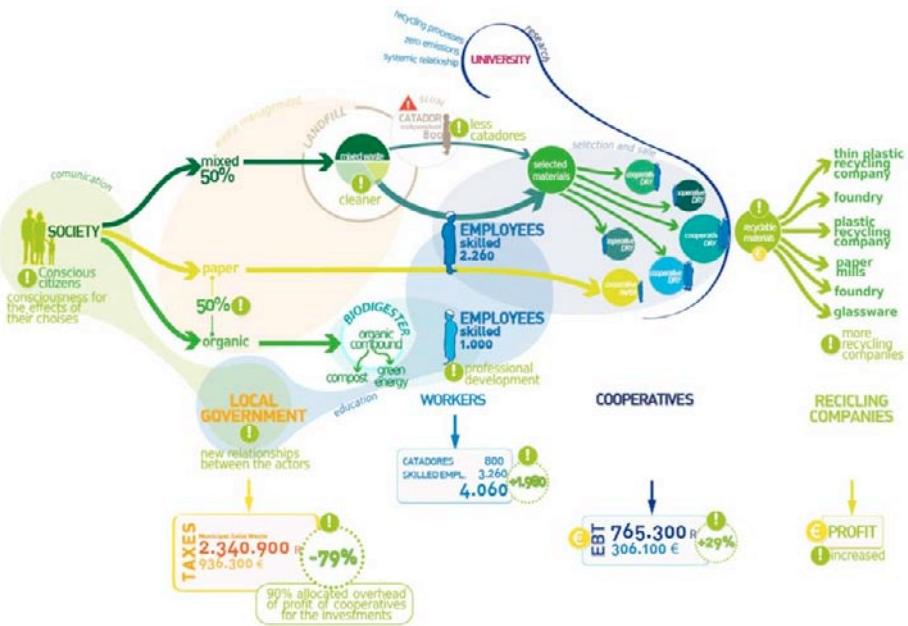
FIG. 6: ORGANIC AND PAPER 50% SEPARATED.

Finally, on a 60% scenario, we estimate a definitive cut of the Urban Solid Waste taxes (0 USW) and a strengthening of earnings through the whole recycling chain. Taxes has finally lowed, that means that the system has reached the breakeven point, as costs for managing the wastes are equal to earnings coming from the recycling chain. In the social field, workers included have been increasing of 2.340 persons and now they work in a safe and innovative context financed by cooperatives. The cooperation with local University leads to great innovations in technological field, systemic approaches to new recycling processes, zero emissions and so on. Researchers and the rising professional figures of systemic culture, assisted by cooperatives, will illustrate new scenarios leaving from the systemic social, economic and environmental consciousness about the wastes. The citizen look at the waste as a resource, acting as a conscious subject linked to the territory that they feel they behave to. They trust institutions, because they assisted the changing toward a better social, economical and sustainable development model. There will be shared social and professional growths, based on information, cooperation and actions, started from the local government, coming up together thanks to the effort of every conscious subject. Knowledge and innovations continued to be shared among the actors, including the recycling companies that will contribute and adapt their productions to the aware society needs. A new society changed in their values, from exploiting the labour of poorest people to prosperity because there are no more social, economic and environmental wastes. The citizen finally understands his central role in the complex system of input/output and starts to be active within

these processes. Now he recognizes that garbage has a value that if properly considered, it can give important visible outputs. Last but not least, the evolution started from conscious choices made on the territory in terms of re‑using the resources and in terms of relationships between the stakeholders, in order to design a new scenario of cultural changing from a systemic point of view, desirable for future generations.
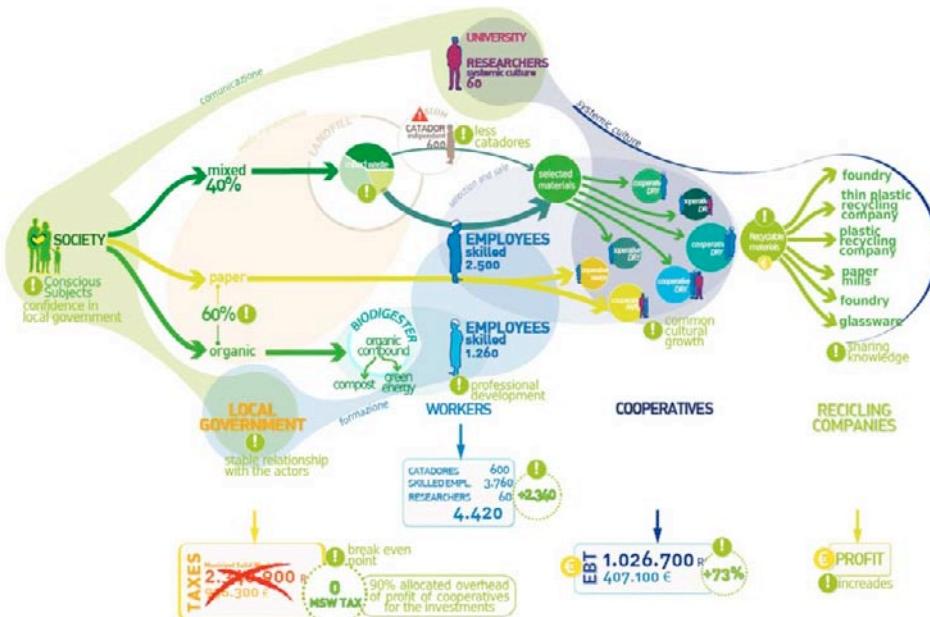
FIG. 7: ORGANIC AND PAPER 60% SEPARATED.

In order to have a general idea of the steps done with the different waste collection we compared in the different scenarios the economic results, costs and earnings in each phase together with investments. This general overview shows the evolution in economic terms and how this is linked to the social evolution of workers and cooperatives.

FIG. 8: ECONOMIC FRAME WORK.

Every single person who in some terms participate to production and consume will be actively involved in this changing, as it is expected no matter the strategies adapted. It will not be possible to come back and make sustainable actions that follow linear or particular logics. The deep transformation in the productive and consumerism system needed can not stand apart from a deeper changing in the consume behaviours and choices. In the systemic approach and its vision of natural metabolism, materials intervene on processes. It is this approach that operates through retroactions, that removes the gaps and re-establishes the spontaneous fluidity of positive metabolism between different systems[11].

Finally the systemic method allowed us to underline the main problems in the state of the art. The linear logic of the garbage system, as we analyzed, creates important lacks on environmental, social and economic field. Innovation and growth in the territory is difficult if we continue to approach to this problems in a linear way. It was necessary, thus, a change in approaching the problem with the systemic logic in order to underline the relationships between actors and his consequences, step by step. Separate waste collection and economical benefits are only a part of the complex connective system activated in social context. We get to a gradual change, considering the relationship that are connecting the actors, the input/output exchanges realized, innovation and knowledge and how they are shared.

[9] Bistagnino, L. (2011) *Design sistemico*. Bra, Slow food Editore.

It is a matter of cultural awareness of the territory, with the evolution of the characters in main subjects at the core of the transformation. In conclusion, the evolution starts from conscious choices made on the territory in terms of re-using the resources and in terms of relationships between the actors, in order to design a new scenario of cultural changing from a systemic point of view, desirable for future generations.

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NEW MODELS OF CONSUMPTION: SCENARIOS FOR SUSTAINABILITY

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The current consumption model identifies the base of the well-being of individuals and the community itself as the possession of property. Agriculture is no exception; as well as other sectors of the economy, it is subject to strict laws of supply and demand: food has slowly transformed into an industrial product, on the one hand becoming increasingly affordable and abundant, but on the other more standard and approved. In addition, if we consider that food chains are one of the most energy-intensive and polluting sectors, it follows that the current pattern of consumption can no longer be socially, environmentally and economically consolidated and supported. The purpose of our work is to define, through the analysis of different case studies, new scenarios of possible development, which can create new positive relationships between the protagonists of the system, and in which the flows of energy and matter constitute new resources and opportunities for the territory.

••• Model of consumption, food system, local economy, territory •••

WHAT IS A CONSUMPTION MODEL?

A consumption model is a set of cultural and economic factors that describe a society and in particular define the characteristics relating to the use of goods and services. In the economic sphere, and in detail in marketing, with consumption models we define the set of issues specifying: what, how, what and when we buy something.

The analysis of consumption can generally be conducted through the definition of three variables: the economic, psychological and sociological one. Of course it should not be surprising that this type of analysis is derived from marketing analysis since it represent, at least until today, one of the greatest economic tools for understanding and developing the consumptions.

Returning to the variables, the economic one represents a limit to the self consume, and it can be identified with the contingencies related to the economy: disposable income, interest rate levels, the relationship between supply and demand, etc.. The other two variables are instead related to the attitude of a person. In particular, the psychological variable refers to

the perception of the individual in relation to the consumption as the result of the meaning attributed to purchasing, the expectations and the perceived risks. In sociology, consumption is linked to the influence that membership in groups has on the subject. Contrary to what happens to the psychological aspect, it is not important the opinion on a good or service, but the claim that it receives within the social group of reference to which the subject wants to belong and to receive consideration.

The sum of these variables, as well as providing excellent starting points for the market analysis as mentioned above, may help us defining a "lifestyle", or the sum of all the values, goals, aspirations, attitudes and opinions that guide the behaviour of each individual. Distinguishing a way of life, and especially its cultural aspects, is the first step in understanding and addressing the definition of a consumption model.

The culture, as it was defined by the geneticist and anthropologist L.L. Cavalli Sforza, is "the accumulation of global knowledge and innovation, resulting from the sum of individual contributions transmitted across generations and distributed to our social group, that affects and constantly changes our life."

Culture is thus a system of rules, resulting from interaction with others and with cultural artefacts, which control humans and forge, placed within a context of economic, religious and legal, the reality of individuals. (Robert Welsch and Luis Vivanco, 2009).

The cultural conditioning is therefore what governs human behaviour and makes us consider as normal certain behaviour as well as gestures and customs.

The models of consumption, whose interpretations represents the focus of marketing studies, are very different and varied with each other, each shaped on the differences of consumer subjects.

It is the legacy of social fragmentation that occurred between the years '80 - '90 as a result of ongoing economic change but also of the increasing weight exerted by consumption and media as factors of the different social positions.

Marketing divides the market into several "lifestyle" in order to create niches in which include products and services, but the consumption model which is universally recognised as the basis of modern society, in many parts of the world and in many cultural systems, is the consumerism.

THE LINEAR MODEL: CONSUMERISM AND FOOD

The term consumerism refers to a cultural model that induces individuals to find meaning, fulfilment and acceptance primarily through the use of goods and services, causing people to associate high levels of consumption to wealth and success. Already by mid 1800's Marx criticised capitalism for not producing goods in order to consume, but in order to accumulate wealth. The basis of this was the capitalist economic system that, by investing money into commodities used in the production process and sold as a product, drew a sum of money greater than what was invested.

The product of human labour, the goods, acts as an "ideological fetish" who is credited with an independent life which conceals the social relations between men. Thus, in Marx's theory of value, goods rise to the role of social intercourse, and likewise the social relations between men take on the appearance, in exchange, of relationship between things. Consumerism appears as a mass phenomenon in Europe and United States after World War II when a general enrichment, highlighted by increased demand for food and goods, showing to western countries a degree of prosperity hitherto unknown.

Maintaining this prosperity was closely linked to the continued expansion of demand for goods and their consumption. Thus the "consumer" began to be induced, by advertising and the growing presence of the media, to buy more and more. Consumerism was helped by the spread of credit instruments, including credit card, and the rate of exchange, which allowed them to purchase goods while not having the money to afford it.

So it was that many people, though not wealthy, began to buy goods that were no longer needed to meet precise and real needs, but whose possession made them feel in step with the times of a company continues to grow. It began, in other words, the economic and cultural phenomenon that we know and that lasts to this day, and that if on a side presents numerous problems, on the other is a good social system in which you work to consume and consume to work .

Too bad that the mechanism of GDP is unfortunately perverse and wrong: you can not consume more and more, there must be a balance. Economic growth as it has traditionally manifested itself does not produce wealth or improves the quality of our life anymore. The alarming environmental implications, the numerous social problems and the tragic problem of energy resources are now under the eyes of all.

It is sufficient to analyse the data reported by the Worldwatch Institute, the preeminent observatory of the environmental trends of our planet, in his "State of the World" to realise how our "lifestyle" is not only not producing prosperity but, if we do not take concrete decisions in a short time, may even have catastrophic effects on our planet.

In 2006, the 65 countries with high incomes were responsible for 78% of spending on goods, but constituted only 16% of the global population. The same year, the United States alone, spending on goods was 9.7 trillion dollars - about $ 32,400 per capita - which accounted for 32% of total, with only 5% of world population . The Worldwatch's report points out clearly that these countries urgently need to rethink their consumption models, because the planet can not sustain such high levels. In fact, if everyone lived like Americans, the Earth could sustain only 1.4 billion people instead of the actual 7.

At slightly lower levels of consumption, although still characterised by high incomes, the planet could support 2.1 billion. But even with lower incomes - the equivalent of an average earn in Jordan and Thailand - Earth could sustain less people than the current population. These figures show a reality that few want to face: with the current 7 billion people on the planet, modern models of consumption, even at relatively low levels, are not

sustainable. (State of the World 2010 ⁄ Transforming the culture of consumption).

The current model extends the gap between poverty and wealth, and now that we are il⁄luminated by the effects of the economic crisis, we approach this abyss, disguised by years of reckless and enjoyable spending, we are outraged and protest for fear of losing what be⁄longs to us . Frightened by the possibility of having to stop consuming, we are approach⁄ing the arms of the green⁄economy, which seems to be not so green, whose purpose is only to feed in different ways the least mechanism of consumerism.

FOOD AND CONSUMPTION: CURRENT SYSTEM EFFECTS ON FOOD

The current model of consumption is the outcome of the development of a industrial cen⁄tralised system, based not on the welfare of people, but on economic and political values of the market.

As any other economic sector, agriculture have applied the strict laws of supply and de⁄mand, with substantial consequences and fallouts on the agri⁄food industry.

The food has gradually transformed into an industrial product, on the one hand becoming increasingly affordable and abundant, but on the other more standardised.

"In the global system of agri⁄food industry, food have become as any other goods, neither more nor less, such as oil, wood and other goods to be exchanged, the price is established around the world from the international stock exchanges. Wheat, corn, coffee, cocoa all of them are commodities how metal or energy, goods subject to supply and demand law, distributed on market without any qualitative differentiation and without any matter to who produce "(C . Petrini, 2007)

The production intensification has made the large⁄scale use of pesticides and antibiotics necessary, in order to respond to quantitative and aesthetic standards demanded by the market. Through the chemistry introduction, mechanisation and the application of the in⁄dustrial principles to the agriculture, seeds and local races have been gradually supplanted by hybrids more productive and profitable, "the control of agriculture is passed from the hands of farmers to those who can influence the market "(R. Patel, 2007).

This profound change began around 60's and has been widely introduced both in West⁄ern countries than in developing ones in order to defeat hunger, getting off what is called the Green Revolution.

As the FAO (Food and Agriculture Organisation of the United Nations) reported, during the Green Revolution, governments in both developed and developing countries invested heavily in agricultural research. Modern science was put to use to find ways of producing more food and this revolutionised the way agriculture was done. Intensive breeding and selection led to the development of high⁄yielding varieties of crops and more productive breeds of livestock. There were also breakthroughs in the development of agri⁄chemicals, like pesticides and fertilisers. And to bring the revolution directly to farmers' fields, gov⁄ernments supported producers with encouragements to use these new farming techniques

and technologies. Initially, the revolution was seen as a tremendous success. As populations grew and demand for food increased, so did the food supply. Food prices remained stable. But since the 1990s we have become aware that the Green Revolution's surge in productivity came with a heavy price.

Industrial agriculture was not longer able to create a virtuous balance between used and released resources, getting an extremely energy-intensive and polluting process. The land has been impoverished and reduced to mere substrate in which to plant seeds, feeding and defending with pesticides and no more with sun, manure, and the crop rotation, but with chemical fertilisers; these changes have altered the soil fertility , distorting the natural nitrogen cycle.

The farm has become industrial and quoting M. Pollan, "agriculture is no longer an ecological cycle, but has become a factory ... and as all factories, the factory farm is powered by fossil fuels."

The effects of this current industrialisation are considerable, ranging from air pollution to the over soil depletion, substantial irrigation needs to the dramatic loss of biodiversity.

According to the FAO, 60% percentage of the world's ecosystems would become degraded or used in an unsustainable manner; since 1990 we have lost about 75% percentage of the genetic diversity of agricultural crops, and three-quarters of global nutrition depend on only 12 species of plants and 5 races of animals. This loss of diversity is called "genetic erosion", and also in Italy has caused an extreme simplification of farming systems, from the detriment of the sustainability to the crop security. This loss is directly reflected in food: considering the thirty thousand edible species in nature, only 30 are food crops that represent the 95% percentage of the world's food requirements and, of these, wheat, rice and corn provide more than 60% percentage of the calories consumed.

Concepts such as seasonality and typical food have been altered by inducing consumers to dispose of any product anywhere and at any time. Adding to this the policy of lower prices, implemented by the large-scale retail trade to respond to the competitive logic of the market, we see a clear separation between the sale price and the actual value of the product. Therefore the cheapness and convenience behind our purchases hide different consequences. Primarily on the relationship that we have with food. Indeed, in the last few years, we have left the natural world behind, altering our natural rhythms and losing our material culture;"There has never been in human history such a confusion about what is good to eat or not eat","with its 17,000 new food products introduced every year, and the marketing muscle used to sell these products, has overwhelmed the force of tradition and left us where we now find ourselves: relying on science and journalism and marketing to help us decide questions about what to eat." (M.Pollan, 2009).

The loss of knowledge combined with the wide choice available leads to waste an enormous amount of edible food, and to dissociate the impact of purchasing decisions from the caused effect on land and health. What we are experiencing is a "big fat contradiction"

(R. Patel, 2007) "Agricultural production could abundantly feed twice the present population on the planet" (A. Sangrè, 2011). In England, about 6.7 million tons of food per year are thrown away, which corresponds to 15 million tons of carbon dioxide (DEFRA, 2007); in Italy are thrown away over ten million tons of food per year, means that every Italian family spends an average of 515 euros per year in food that it will not consume. The alteration of the relationship with food has consequences also on health, the increase of disease s and dysfunctions related to food in Italy cost about 8.3 billion euros per year, their average rate has increased from 7.3% to 9.9% between 1994 and 2007.

The listed data represent the magnitude of the problems arisen by the food industrialization. The consequences in terms of social, cultural and environmental costs are clearly visible throughout the production chain, from the transformation of peasants into "piece-workers" (Petrini C.), to the loss of biodiversity; from the dependence on oil to the intermediaries number increase, from waste to health damage.

So what does quality mean in this case? The values generated by an industrialized system are related to standardization and to approval, in addiction to the aseptic and standardised production context, to the quantity and the wide choice proposed, as well as the competitiveness of the final price. Nevertheless, parallel to the burgeoning agricultural industrialization, numerous realities have sprouted up, breaking away from the centralized economic system, have autonomously and consciously tried to interpret a different food system. The promoting protagonist of the projects, are vary in nature from small producers as purchasing group and food communities, to the transition towns. As the variety of proposed solutions, some explore the relationship between producer and consumer, others bring to centre the environmental and energy problem, another ones the fosterage of community and local culture. In all cases it is clear, however, a strong need for change able to re-establishing the natural relationship with food and nutrition.

FIG. 1. CURRENT MODEL VALUES.

TRANSITION: CASE STUDY

To a model of consumption, strongly linked to concepts of globalisation and centralisation of power which finds its identity in the uniformity and standardisation, several alternative models developed in parallel due to a spirit of criticism and objective difficulties.

These development models offer a different vision of economy "based on a clear and conscious choice" moving "the interest from real people" and restoring "a balance between city and rural life" (E. Schumacher).

It is also important to consider how this quest for independence and desire of detachment from the current system, it does not act as a sense of niche but it is reflected in a widespread manner in the Community policies and initiatives in many parts of the world, especially since they represent the central question about food or energy and not merely an economic aspect.

Many of the cases that will be presented below represent a transition from the current situation, a breaking point and reinterpretation of existing rules of the game, an upheaval that generates a positive impact on society, or to be more precise on community, on economy as well as of course the environment.

The dynamics that are put to use are based primarily on redesigning the relationship between the producer and the production environment, among those who consume and the community; between education and the promotion of a lifestyle more aware and active. It then tries to change the point of view, abandoning the individualistic attitude generated by consumerism, to focus on new concepts of autonomy and awareness.

CASE STUDY: ANALYSIS AND SELECTION CRITERIA

Looking for practical steps and concrete measures to witness the translation of models and attitudes, we remain stunned at the sheer variety and richness. The mass of case studies on consumption models on food and alternative energy is indeed wide and varied, a quantity which made necessary, as well as a first screening, a catalog for macro arguments and a definition of the limits of intervention. The case studies chosen are confined within a boundary defined.

Three distinct areas of action have been told apart, mainly triggered by the mode in which the initiative was born and grew.

The three macro sets have been identified under the name of: policy, community and city.
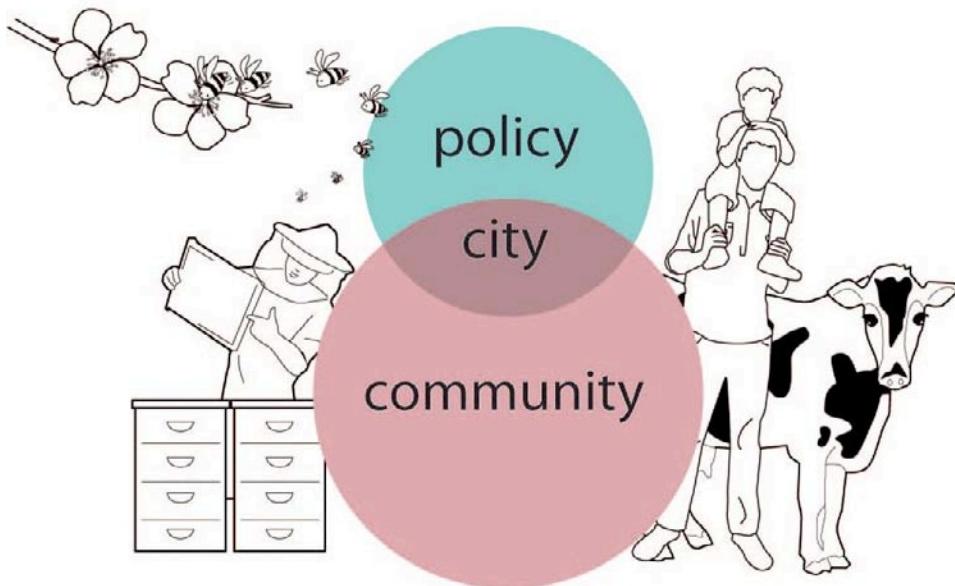
FIG. 2. THE THREE MACRO SETS: POLICY, COMMUNITY, CITY.

POLICY

The term policy refers to all the initiatives "top-down", or that are proposed and sponsored by public or private corporations. Education and promotion policies, primarily aiming at information and dissemination activities, space out to real food management projects in the urban area. Giving an overview of the various initiatives, projects aim to:

· TO PROMOTE and EDUCATE citizens towards more sustainable and healthy lifestyles through initiatives ranging from simple awareness campaigns to the redesign of food system in school.

· TO INFORM about products, as in the case of labelling policies, beyond the mandatory notions about origin, variety and nutritional value and try to guide consumers towards a critical choice. Such in the case of the Carbon Footprint, a British brand, that indicates, through the icon of a mark on the packaging, the amount of CO_2 required for the production, processing and transportation of the product.

· TO PROHIBIT or better INHIBIT certain attitudes or choices which include for example choice editing policies. One of the best examples is the campaign against the use of plastic bags, operating in different European countries, or with campaigns of inhibition, as in Ireland, where the application of a fee to plastic bag has leaded the consumer towards the reusable ones.

· TO STIMULATE the local economy of small scale, not only through a policy of

financial assistance and facilities for access to credit, but mainly through initiatives that enable small farms to be considered in tenders for public canteens or supplies in catering.

· TO CONSERVE the environment and biodiversity: on the one hand through the regulation of human activities in certain areas designated as protected, such as restrictions on fishing and the collection of certain mushrooms, herbs and flowers; on the other, through awareness of visibility for producers who choose to nurture and cultivate native breeds and seeds, or which have their own working and processing.

COMMUNITY

The community includes those initiatives that develop from the "bottom". Proposals are often supported by the courage of individuals who, dissatisfied or crushed by the economic and social system, choose to try a new way, regaining possession of their autonomy and identity.

In other cases, the push for change is primarily promoted by ethical grounds, rooted in the refusal of the current logic of the global and centralised industrial model. This separation leads to put into practice and to promote behaviours and lifestyles more aware and proactive.

So we can see notice the presence of motivation from economic and from ethical issues, a mix that leads to the common goal to experience a parallel and alternative model to the dominant one.

The case studies collected show how these changes may be proposed and implemented by all the links in the chain, starting from the two ending-poles, the producer and consumer, and then going through the distribution and the sales networks.

How does the relationship between producers and consumers change?

Between producer and consumer the main passage being implemented is to cut the number of intermediaries that separate them, outlining a "short" chain.

The way this transition occurs may be of various kinds: the direct sales company, and buying groups in the local market.

With regard to direct sales, however, we must premise that this practice is actually difficult to classify uniquely. The economic linkages between small producers and consumers is often put in an informal setting and daily habits, in which the logic of exchange or direct relations have always been present. This situation makes difficult to assess in terms of quantification and determination its dimension. What is interesting, and when this step is an opportunity for farmers and ranchers to disengage from their position as the last link in the global market. To manage independently the processing and sale of products, becomes a way to reclaim the value of their work.

The farmer's market, now spread in various forms, adds to the direct relationship, the social side of the market and user-friendly and creates a new space for meetings between small producers and consumers.

Markets often self-regulate through their own disciplinary which sets out the characteristics

that a farmer must have in order to aggregate and sell their products. These specifications are often linked to the type of products, coming only from local territories, and their quality. If to promote the rapprochement between these two players in the sector is represented by the pole of the consumer, the most famous and popular initiatives concerns the "pur⁄chasing group" groups, which are appointed and developed differently according to the country in which they are.

Although in their specificity, they are examples of alternative food networks that seek to put in communication small farmers and urban consumers in order to create a relationship of trust and solidarity between town and country and to heal the rift between society and the environment that has been created by industrialisation and agricultural modernisation. They are also forms of support to agriculture, practiced on a small scale, through which it is re⁄evaluating the role of farmers, their work and their knowledge. These experiences of short chain seek to encourage healthy and seasonal food supply and thereby develop the local economy, as well as develop a sense of belonging to a community.

Since a few years the same networks have broadened the vision of the food chain to the energy production, by proposing the output of it from renewable sources "in a context of democratic energy." For example in the case of the "CO⁄energy" the service is based on using a public space for a PV system, especially designed for those who can not do it on their own.

A NETWORK OF ALTERNATIVE DISTRIBUTION AND SALE

The initiatives born in this field are often driven by a strong sense of ethics and environ⁄mental responsibility especially with regard to the production of CO_2, energy inefficiency due to the transport of large⁄scale distribution, the production of waste due to packaging and the unfair distribution of profits along the supply chain.

The analysed cases mainly run through three major tracks: the first concerns getting in touch the urban reality with the agriculture, the second one aims to change the logic of sale and packaging of products, the last one represents all the examples of production and distribution of energy from renewable and indigenous sources, the Smart Grids.

In the first case, it is not just matter of establishing a direct contact between producers and consumers, but to create a distribution network on a small scale that allows the firsts to sell their products without having to use their energy for trading and the seconds to buy fresh and local food not needing to go to the farms. Many people consider this goal as a re⁄appropriation of the world related to food, detaching itself from the logic of large⁄scale retail and food industry.

"Growing Community" is a prime example of how an alternative system of distribution can be implemented. The project was born and grew up in Hackney, a London borough located northeast of the city with the aim of putting the community in connection with agricultural producers. It is based mainly on providing a service that allows all citizens

who participate to have a supply of seasonal fruit and vegetables grown no more than 40 km away. Through a subscription you are entitled to a weekly box containing products. You can choose the amount and composition of them according to the weekly availability, the withdrawal takes place in the various "pick-up point" located in the district. The project was shared by consumers and by the local rulers, and currently in London other three networks, based on this model, are at their development.

With regard to the sales network, the focus falls mainly on the production of refuse due to packaging or wastage. There are several examples of outlets offering the application of the bulk sale of its products, including the "Negozio leggero" in Turin, or "Unpackaged" in London, or "In.gredients" in Texas (USA). Often the bulk is associated with proposals for regional and biological food as well as promotional activities and education for the community.

CITY

The term City shall mean all the initiatives that see a close relationship between the policy and the community, both present but not necessarily with the same balance, leading to the realisation of projects with greater coordination and complexity.

Among these initiatives, stand without a doubt the transition towns. They have a very strong component of community, because the change is promoted and implemented by the population itself, but then the project is also supported by local authorities.

FIG. 3. THE MAIN SETS HAVE BEEN DIVIDED IN SEVERAL SUB-AREAS TO COLLECT ALL CASES STUDIES ANALYSED.

The concept of transition stems from research work carried out by Rob Hopkins, in collaboration with the Kinsale Futher Education College of Ireland. Nowadays it finds practical application in many communities. The transition towns have as objective the creation of a proactive approach to address the major challenges that the oil crisis and climate change is imposing on our generation. The Transition Towns can review our current economic system seeking to introduce a new one based on sustainability. Today, there are approximately 3823 official initiatives, located in almost 32 countries but mainly present in Ireland and United Kingdom. In Italy one example comes from Monteveglio (BO) that serves as a hub for the transition in our country (24 other cities).

Other examples are closely related to planning city-wide management of food and energy, namely the Urban Food planning. These initiatives have a strong component of policy, institutions and municipalities are often the organisers and sponsors of the implemented projects, but they are not limited only to handle the food in public canteens trying to offer a wider plan. Examples of Urban Planning have developed in many cities, including Amsterdam, New York and San Francisco.

Another interesting case is the recovery and upgrading of urban farms in Milan, which is part of the project for the organisation of the Expo 2015, to think back to these places as living and active within a new relationship between cities and agriculture.

A NEW CONCEPT OF QUALITY

The realities seen in several case studies, even if with its own specificity, show a common way to develop a different economic model. The main challenge is abandoning the linear logic of the production systems linked to current consumption model, proposing and implementing methods of production and alternative distribution channels. To describe this process of detachment we have been used the word transition, in order to emphasise the process of change that they are carrying out. The crisis of the current economic model has meant to them an opportunity for change.

FIG. 4. TRANSITION MODEL VALUES.

For someone a radical change was the only solution to keep surviving, but, for others the crisis was not an obstacle but a challenge for creating wealth in their own territory.

One of the rediscovered values has been the autonomy. It has been created through the building of a short chain and the independence from the outside contractors, as well as the management of the whole production process, from production to processing up to sale.

On the one hand, these choices have been led to an important cultural investment, to improve business processes that previously were not made. On the other hand, an economic investments have been need to fulfil new facilities. However, all that had the positive impact at every stage, in fact, managing the entire production process led to a greater awareness of the whole weaving factory. As a result, business decisions will be targeted not to the quantity but to the quality of the final product, with attention to both the breeding and farming method. the strength of this stage is the focus shift from quantity and required standardisation by the global market to investment on its know-how to ensure the products and production process quality. Furthermore, the consumer
is gaining a burgeoning quality perception, due to the direct link between the context of production and product.
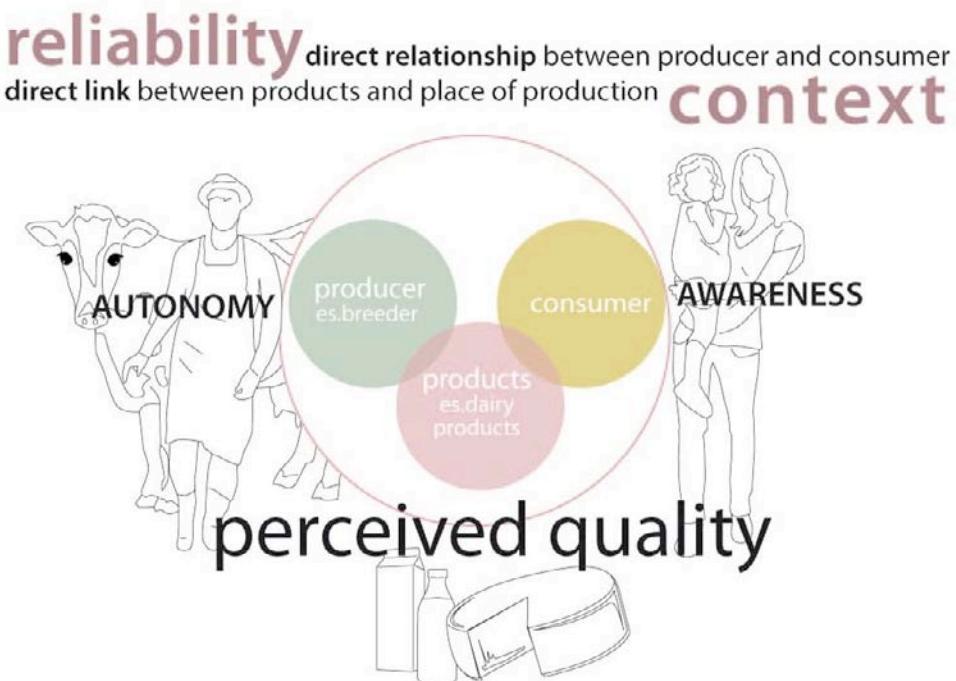
FIG. 5. TRANSITION MODEL AS PERCEIVED QUALITY.

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SYSTEMIC APPROACH: TERRITORY AND QUALITY

The economic growth, characterized by a constant race to the consumption and by a linear production system, can no longer produce wellness or improve the quality of our life. In addiction, If this race corrupts the systems that guarantee the life, such as agriculture and breeding, to follow exclusively the purpose of economic prosperity, it will mean having to start seriously thinking about a change. Industry uses without planning and policies, except those dictated by the law of the profit, natural resources and turn them into disposable products. Insomuch as the polluting environmental implications, as well as the dramatic problem of energy resources are now under the eyes of all. The transition toward a new model of consumption is possible and desirable and it is, as we have seen, has already begun. For several years, the number of realities which are trying to offer a different way of thinking and acting are growing, they represent a new economy that operate on small scale and put in the centre of the project sustainability and community wellbeing.

The Design, which until now has been the instrument of consumption in its most frivolous form, may redeem and represent one of the interpreters of this change but as soon as possible need a shared understanding and good practices to follow.

The designer should provide through his work these models and help to implement them, thanks to the ability to create links and connections between different realities, creating a complex and interconnected system. A Design oriented to territory and local development, which considers the knowledge and resources, which fosters development and not exploitation, in order to generate wellbeing and not just profits.
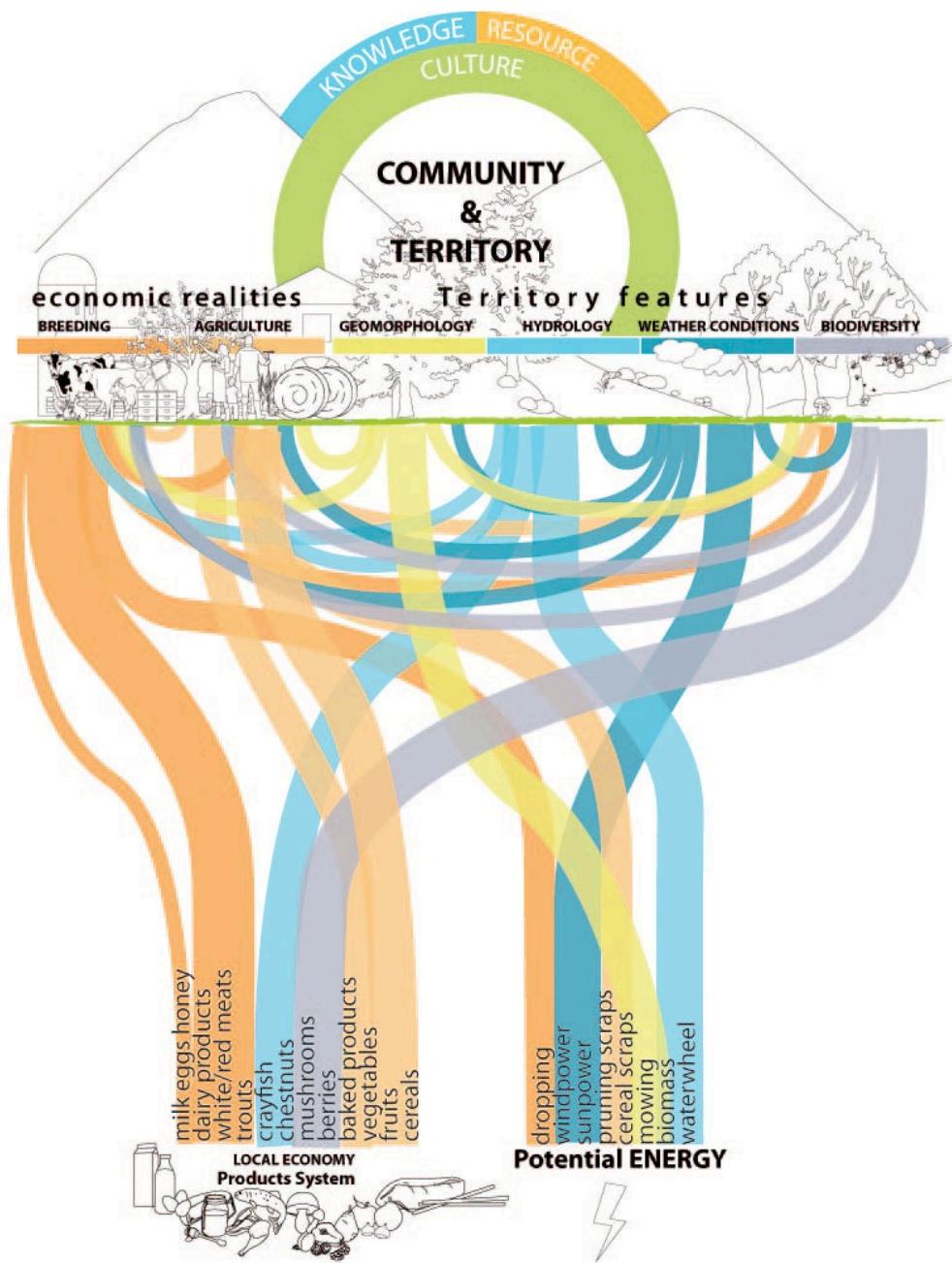
FIG. 6. THE CONNECTIONS BETWEEN THE COMMUNITY, THE TERRITORY AND LOCAL ECONOMIC REALITY REPRESENT THE POTENTIAL LOCAL ECONOMY, IN TERMS OF PRODUCTS AND ENERGY.

Each area has its own profile, made of soil and climate factors, cultures, traditional knowledge. Its inhabitants and the landscapes they have created, are a mixture of physical and cultural needs. The designer must understand how the identity was born and evolves in a territory in order to combine the peculiarities of production with the enhancement of traditional knowledge, while keeping an eye both on the true well-being and the economic factor.

FIG. 7. SYSTEMIC MODEL VALUES.

By studying the relationships between the current and foreseeable economic realities, the community and the territory itself, is difficult to determine what is the potential of the local economy, not only in quantitative terms of income, but also social, cultural and environmental.

The strength of agriculture is the close connection it has with the production of energy, but above all with the territory itself. No other activity is so closely related. This is evident, especially when you take as a reference point the realities of small-scale. They are the result of the territory in which they develop. In their products it is possible to find the territorial peculiarities that generated them.

The added value of a systemic process lies in considering these realities, not as individual units, but as part of a network, based on exchanges of matter, energy and knowledge among its members and the territory itself. The connections that are formed between nodes are based on a relationship of interdependence and create a sense of shared responsibility

throughout the supply chain.

In these terms, the product ceases to be a single entity, but it becomes primarily an expression of a network of relationships.
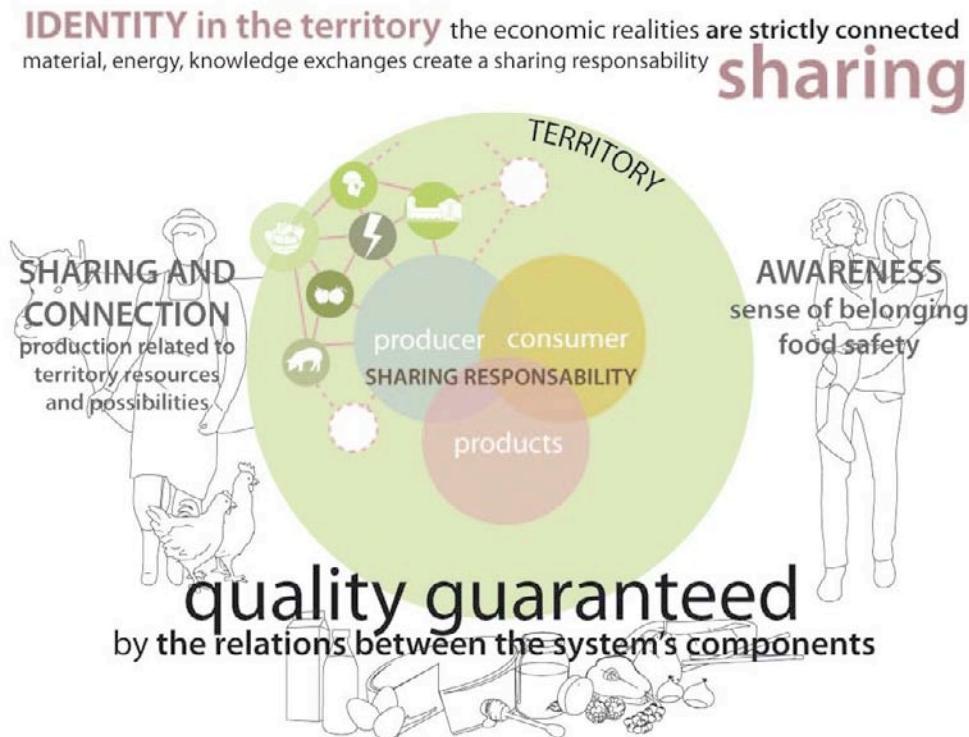
FIG. 8. IN THE SYSTEMIC MODEL, THE QUALITY IS GUARANTEED BY THE CONNECTIONS BETWEEN THE SYSTEM'S COMPONENTS.

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DESIGN USED AS A RESOURCE IN THE INCREASE IN THE VALUE OF GOODS AND CULTURES: PROJECT DESIGN AND COMPETITIVE INTEGRATION IN THE ESTRADA REAL TERRITORY, BRAZIL (PHASE II)

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The study presented here aims to demonstrate the advances of the *in fieri* Project: Design and Competitive Integration in the Estrada Real Territory (PER), in the context of material, immaterial and historical culture, in a route corresponding to eight cities of the Estrada Real (ER) in the region of Minas Gerais - Brazil. Through the research partnership between the School of Design of the UEMG and the Politecnico di Torino, we saw the need, continuing as a second phase of this project, to define effective actions, throughout the breadth and scope of design, which should be able to articulate and enhance the development of the territory in question, having as a basis the increase in value of the local identity and culture, in pursuit of socio-economic and environmental balance.

This research involves the opportune participation of students and teachers from both universities, in a design action that also includes the insertion and distribution of territorial marketing in the Estrada Real through the following pilot localities: São Brás do Suaçuí, Entre Rios de Minas, Casa Grande, Lagoa Dourada, Resende Costa, Coronel Xavier Chaves, Pratos and Bichinho. Actions aimed at the increase in value of local products and services have been established through the recognition of the territorial potential and skills, as well as through the communication relationship between these means and the investigated context, in order to strengthen and propose new systems of production and

services that respect the regional vocation and establish creative and innovative cooperation networks of sustainable emphasis.

In this second phase of the research, we show the results of the project alternatives that were generated, analysed, improved and developed by the Italian-Brazilian work team (Polito-Uemg), in which we prospect possible project issues, such as: information networks, sustainable handicrafts, local nature, typography with regional icons, mapping of local cultural events, merchandizing products for hotels and restaurants, local music and melodies (ER Net, Eco-art Zoo, Zoom in on Nature, (Re)Write, Calendar, Info-tools for Food and Table, Book of Musical Traditions). We emphasize that all concepts to be developed focus on the interface "territory, sustainability and design" and seek to contribute, in an original and innovative way, with the many actions inherent in the Estrada Real territory.

••• Design and local increase in value, territorial culture, meta-design and eco-museum, sustainable development •••

1. INTRODUCTION

The present article has the purpose of presenting the deepened results of the research work applied to the Project: Design and Competitive Integration in the Estrada Real Territory (Per), from the application of Meta-project tools. The richness derived from the material, immaterial and historical culture of the territory conventionally called Estrada Real, has demonstrated a growing potential of local development. The Per has verified, through its researches and analysis, that the way this territory has gained visibility does not contemplate all this richness, be it because of the investors or because of the local community itself. This way, the Per - partnership between the *Escola de Design de Minas Gerais* (School of Design of Minas Gerais), Politecnico di Torino and the *Centro Minas Design* (Center Minas Design) - has worked in proposals that, through design, should be able to articulate and enhance the development of the region, based on the increase in value of the territory's identity and on the pillars of sustainability – society, economy, environment and culture.

The goal of this work of research applied to the design project is to increase the value of the territory through its own resources, be them tangible or intangible. Here stand out not only the natural patrimony, the variety of raw-material and productive processes, but also the historical value and the sociocultural diversity of the investigated region, and mainly the information of where to find all this richness.

At the end, we present the project proposals of intervention, destined to the increase in value of the culture and identity inherent to the territory, considering a determined route as an "experimental laboratory" and the local identity as a model of projectual reference.

2. COMPETITIVE INTEGRATION IN THE ESTRADA REAL TERRITORY

The importance of the paths that integrate the Estrada Real has motivated the appearance of villages and cities throughout them. With time appeared chapels, ranches, sales places, offices, houses of *pau-a-pique*[1], where the social actors have articulated themselves and become part of a vast and rich political, cultural, economical and social history. With more than 1.600km (994.2 miles) of history, the Estrada Real, comprehends different local cultures, more intensely in the Brazilian Colonial Period, allowing the construction not only of routes and paths, but also of a singular history of this territory and the actors involved in it: *bandeirantes*[2], *tropeiros* (muleteers), military officials and many travelers and peddlers who have found, in its ways, the material and cultural transportability throughout products, gold and diamonds.

The Estrada Real Territory is a Geo-touristic complex formed throughout the systemic relationship of its paths: the Old Path (*Caminho Velho*), the Path of Sabarabuçu (*Caminho do Sabarabuçu*), the New Path (*Caminho Novo*) and the Path of Diamonds (*Caminho dos Diamantes*), and the limitrophe geographical composition, determined by ten zones that are divided by historical and geographical importance, in certain Touristic Regions of the Estrada Real, being them: *Diamantina, Conceição do Mato Dentro, Ouro Preto, Barbacena, Juiz de Fora, Rio de Janeiro, Vertentes, São Lourenço, Terras Altas da Mantiqueira* and *São Paulo*. Standing out that the Touristic Regions of Rio de Janeiro and São Paulo are inside the limits of their respective federal states. (Figure 1).

FIG. 1. ESTRADA REAL TERRITORY | TOURISTIC REGIONS OF THE ESTRADA REAL COMPLEX. SOURCE: PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010)[3].

[1] A type of house that is constructed with wood, bamboo, liana and mud.
[2] Members of the 16th–18th century South American slave and richness-hunting expeditions called Bandeiras.
[3] The projects team of the School of Design of the UEMG is integrated by the professors Dijon De Moraes, Roberto Werneck, Lia Krucken, Paulo Miranda, José Nunes, Ana Luísa Cerqueira, Glaucinei Correa, Igor Rios, Márcio Lambert, Ricardo Portilho, and by students of the third year of Design of Products and Graphical Design.

3. FOCUS ON THE ANALYSIS AND PROCESS

Based on the investigation around the Estrada Real Territory, knowing its paths and relations, associated with the social-environmental relations and with the touristic and economical potential, problems and failures have been verified, with the focus on the study and on the methodological application in a stretch that is not very structured for touristic reception nor has regularity of paths nor proper orientations. Besides physical problems and deficient infra-structures, we have noticed the lack of consideration, by the local actors, of assimilating the local true Eco-touristic potential, by not doing, for example, preventive policies oriented to protect the material and immaterial patrimony. This way, the maintenance and increase in value become necessary, with the aim of generating income and currency to the local communities, being identified, therefore, the possibilities of intervention by the design.

The projectual method adopted for this work had as focus the meta-project and the systemic design, associated with the participative methodology. The objective was to develop proposals of actions that can be appropriated by the territory's community, what is a fundamental aspect to promote the continuity, and, therefore, to give sustainability throughout those who are part of it. All the information that has lead us to the elaboration of the presented proposals were obtained and/or verified with the communities situated at the selected pilot stretch: *São Brás do Suaçuí, Entre Rios de Minas, Lagoa Dourada, Resende Costa, Coronel Xavier Chaves, Prados* and *Bichinho* (Figure 2).

FIG. 2. SELECTED STRETCH INSIDE OF THE ESTRADA REAL COMPLEX, IN THE TOURISTIC REGION OF VERTENTES, FOR THE ACTIONS OF THIS PROJECT. SOURCE: PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

One of the project's specific goals is to attend the variety of people that interact with the cities and their natural, social and cultural attractions. Local people, Brazilian and foreign tourists, who have demands and needs, sometimes ordinary ones, sometimes very specific ones. For that, each project proposal that has been developed, specially had the precise characterization of their target public. It is worth standing out that, in what concerns the local population, we have tried to integrate the actions of the many proposals with emphasis in the innumerable possibilities of actions with a social-educative character, since the conductor axis of this work is the cultural, material and immaterial patrimony and the historical and environmental patrimony, considered here as the main resources of the Estrada Real territory.

4. METHODOLOGY OF INTERVENTION

The methodology of intervention applied and approached by the project, such as the meta-project and the systemic design, used many analytical and reflexive instruments, amongst which, there were study of cases that retreat the Italian experience throughout applicative examples of Eco-museums, such as the *Scopriminiera*, an Italian Eco-museum created in the Region Valdese of Piemonte, in 1998. The initiative has renewed its installations, transforming an old deactivated mine of mineral talc into a touristic interactive structure in the well known alpine valley, Val Germanasca, situated at 70km (43.5 miles) southeast of Torino. The actions of this project were coordinated by the Architects Professors: Giorgio de Ferrari, Claudio Germak, Claudia De Giorgi and Maurizio Lucat, all professors at the Politecnico di Torino.

The actions undertaken in the project *Eco-museu Scopriminiera Val Germanasca* are extended to many areas. Amongst the most important ones, stand out the preservation and increase in value of the local patrimony for the creation of products of cultural tourism, investigation and formation of local agents, communitarian actions with the development of projects for the creation of communication maps, and production of interactive expositions and the activation and the management of local nets in a national and international level (Germak e De Giorgi, 2008).

According to Germak (2008): "*the exaltation of the doing and providing, through the cultural increase in value told by the regional historical context and its traditions, has demonstrated an exponential touristic and economical projection, through simple and directed elements, identified as the sociocultural and iconographic elements of the territory: people, nature, subjectivity elements, work and artifact tools, culinary.*" For this projectual experience, there was, a priori, the raising of the cultural, social and economical value of the region where the oldest mine is situated, and, afterward there was the application of a projectual methodology.

Fundamentally, in this work we have used the Meta-project applied to the Territory's local identity, as a projectual model. According to Moraes (2010): "*The meta-project aims to go beyond the project, transcending it by making a critical and reflexive reflection about the projectual*

context itself. The meta-project thinks the project, analyzes the demand and prospects about an existent or future scenario, having as basis the raising of researches, critical analysis and reflections made earlier, throughout previous data recollection".

Moraes (2010) complements that "*the meta-project explores all possible potentialities of design, but it does not produce output, like a single project model, and pre-established technical solutions. This methodology aims to propitiate, through a pack of tools, a previous conceptual analysis (concept) or a corrective analysis (diagnose), where there are positive and negative points related to the project, through the application of models of analysis and meta-project actions.*"

Inside of the existing complexities, through the social, environmental and economical relationships which determine the criteria of the sustainability that touch the project, the capacity and amplitude approached in these questions emphasize, in this model, the methodological application of the meta-project as the main instrument for the development of the PER. Other important references considering the relationship between the territory and its self-increase in value are observed by Bistagnino (2007, 2009), with the application of the methodology of systemic design, as well as the exploration with a sustainable character and attention to the increase in value of the territory with meta-project actions observed contemporaneously by Krucken (2009), Germak, Moraes, Miranda e Krucken (2010) and Moraes, Krucken e Reyes (2010). Other advanced studies in design, which make specific approaches to the methods, can be contemplated through the organization of Morais (et al., 2011), who makes a reflection of researches of many Brazilian and foreign universities about the project models related to design.

5. THE CONCEPTUAL PROPOSALS

The continuation of the Project: Design and Competitive Integration in the Estrada Real Territory defines, as the next step, the execution of the hereby proposed actions, leading to their implementation. Considering that each proposal involves products with different characteristics and implementation time frames, it is also necessary to have them individually assessed, to allow a precise understanding of their technical and financial requirements. Thus, the further development of the proposals depends on the future actions carried out by entrepreneurs: UEMG, CMD, FAPEMIG and local authorities from the participant communities.

5.1 Eco-Art Zoo

The Eco-Art Zoo is a proposal of a museum action about the fauna, that consists of a space that values and promotes the local artistic diversity, the handicraft techniques, the region's nature, the richness of local raw materials and traditional cultural values and that also enhances the tourism in the region. The goal is to articulate actions with the local community and to develop its territory, through the local values and patrimonies. The proposal is to integrate the environment with the cultural, social, economic and technological development of the region, making it a place of gathering, research, conservation

and interpretation of natural and cultural elements.

The concept of Eco-museum is variable since it depends on the ecosystem and society that lives in that particular environment. "It is the society that creates it, since an Eco-museum is a reflection of the population, which is a reflex of the culture and traditions of a territory" (Silveira, 2010). The Eco-museum is, therefore, a territory, a patrimony in which culture and community come together in a common and shared space, defending the preservation of natural resources.

The context is local handicrafts. The proposal is justified by the fact that there is already expressive craft work representing the regional fauna (Figure 3). There is also natural diversity to be explored, presenting a vast range of opportunities to be developed with craftsmen and artists of the region (Figure 4).

FIG. 3. SOME SAMPLES OF MANY OF THE VARIOUS CRAFTSMEN AND ARTIST EXPRESSIONS THAT CAN BE FOUND IN THE RESEARCH AREA. SOURCE: SYNTHETIC BOARD ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).
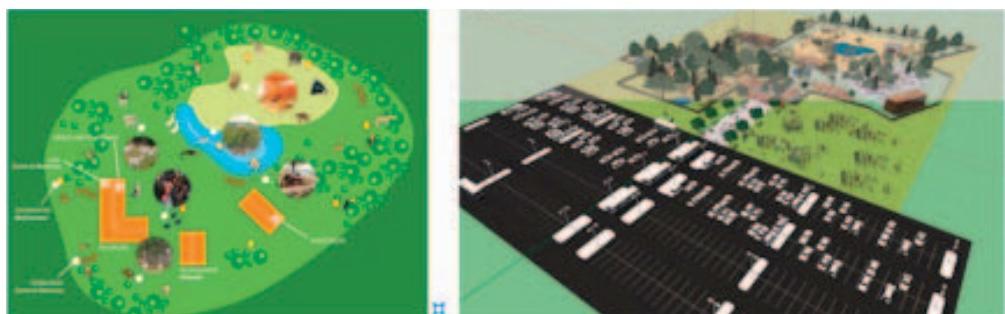
FIG. 4: CONCEPTUAL PROPOSAL. SOURCE: SYNTHETIC BOARD ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.2 Calendar

The calendar aims to promote the events of the cities involved, in an organized and objective way. The main objective of the system´s implementation is to provide community members, visitors and potential visitors with information about activities in the region,

contributing to the participants' social integration while increasing economic and touristic flow in the region.

The information available in the Calendar can reach the main public in multiple ways. Different media formats and semantics will be studied accordingly to the project´s directives, to promote the events planned for the Estrada Real Territory.

To develop the Calendar project, it is necessary to have full knowledge of all existing events in the region. It is also necessary to analyze the available media formats and to promote the interfacing with other proposals of the Project: Design and Competitive Integration in the Estrada Real Territory. Based on this information, it is possible to build models capable of fulfilling all the calendar needs for both, digital and printed promotional products (Figure 5).

FIG. 5. THE CALENDAR, BENCHMARKING AND CONCEPTUAL PROPOSAL. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.3 Er Net

The Er Net Project consists on the development of a touristic information system, designed for handheld devices, in the range of towns and locations sheltered by the Estrada Real Project. It also extends its coverage to the planning of the outdoor structures by which the system will be offered and will support information platforms for users.

The project's goal is to promote the natural and cultural (material and immaterial) richness of the territory ‚ generating more visibility for the regional attractions ‚ and to enrich visitors' experience, by widening and improving their access to information, while attaining to sustainability parameters.

Er Net targets tourists already familiarized with the use of new technologies in their daily life, and will be of great help for foreigners, which will be provided with comprehensive information on locations and events.

Context ⁄ Squares: In general terms and in the studied region, squares are public urban meeting spaces, frequently linked to cultural religious aspects, but also related to commer⁄cial, administrative and civic activities. Urban furniture: concerns distribution, appear⁄ance and functionality in public or private outdoor areas. Contributes to the development and well⁄being of the population. Focuses on how people live and use the urban space, targeting economical development and strengthening of the local culture (Figure 6).

FIG. 6. ER NET, BENCHMARKING AND CONCEPTUAL VISUALIZATION. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.4 Info⁄tools

The shortage and limited access to information regarding the region is one of the foremost deficiencies encountered by researchers in the Project Design and Competitive Integration in the Estrada Real Territory. Given the immense touristic potential of the region, it is crucial to solve this issue.

The proposal allows for the conception of several products, related to several different contexts. Thus, a need for limiting the scope was perceived at the beginning of the project. It has been decided that, in this first stage, the Project will aim Gastronomy, comprising table and kitchen as ambiences, since the theme is one of the region's greatest strengths. Hence, restaurants, cafes and diners are excellent locations for distributing information, as they will surely receive a great number of tourists.

The project's goal is to extend information vehicles as to promote the richness and values of the region. The strategy to do so relies on developing a wide range of items, targeting their use by local businesses, taking advantage of the tradition of the local cuisine. Info⁄tools tar⁄gets several niches of travelers, as to widely spread information on regional points of interest.

The Info-tools project targets tourists, Brazilian and foreigners, who visit the region willing to experience to the maximum its peculiarities and attractions – specially those with autonomy to make slight changes on their itinerary and that are interested in taking home items that refer to their experience while traveling (Figure 7).

FIG. 7. THE INFO-TOOLS, BENCHMARKING AND CONCEPTUAL PROPOSAL. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.5 (Re) Write

The (Re) Write proposition was thought as an answer to the lack of Identity regarding Estrada Real related material. The idea is to develop written and visual languages from elements of the territory's culture, and to let people use those elements in their own way to help building an Identity more directly related to the Estrada Real.

This proposition´s goal is to create typefaces and dingbats related to the culture, history, nature and habits surrounding the Estrada Real. The intention is to use this production in all sorts of materials related to the territory. By doing that, we hope to contribute to the construction of an Identity more directly related to its traditions. The results of this project can also be used as basis to the visual identity of the other PER proposals (Figure 8).

Theoretical Guidelines: "*[vernacular typography is] "writing's handicraft"- Martins, Bruno (2007); "the term vernacular suggests the existence of visual and local languages that refer to different cultures"* - Dones, Vera Lúcia; "*multiplicity of visual repertoires that coexist in our culture (...) it is up to the designer to transform them into new visual languages that translate our cultural identity"* - Finizola, Fátima (2010); "*popular lettering (...) gives us a large amount of visual experiences that*

can be used as a rich source of inspiration to formal design." ⁃ Finizola, Fátima (2009).

FIG. 8. THE (RE)WRITE, BENCHMARKING AND CONCEPTUAL PROPOSAL. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.6 Book of Musical Traditions

The uniqueness of the culture of Minas Gerais is reflected on productions, practices and customs related to the music in this territory. Many of the values there built still have a large presence in its current cultural dynamic. The Book of Musical Traditions emerges in this context as a necessary mean of registration, as well as an alternative way to bring to the general public this cultural content of musical character, that still carries an important presence in the daily life of the regional communities.

The proposal was conceived as a mean of providing registration and visibility to the memorial and current practices related to the Musical Tradition present in the Estrada Real region.

In order to reach the best format to configure the Book of Musical Traditions, several books were analyzed through various scopes, such as formats, contents and organization of the information (Figure 9).

FIG. 9. THE BOOK OF MUSICAL TRADITIONS, BENCHMARKING AND CONCEPTUAL PROPOSAL. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

5.7 Zoom in on Nature

The Zoom in on Nature proposal is based on the concepts of Bionics and Bio-mimetic, which seek to learn from the organic and structural solutions applied by nature to its elements, and use this knowledge to the development of new products. The proposal aims to value and promote the diversity of the regional biome and explore the values and richness of the area, involving local artists and craftsmen in the conception of new products, valuing, as well, the diversity of techniques and materials present in the region.

The project consists of an analysis of this biome in the region of the Estrada Real Project, observing solutions - structures, shapes, textures and colors - that can be applied to the development of regional products, offering a variety of surface patterns with a representative set of structural types and colors of the region.

Influenced by the resources, characteristics and needs of the new economy, the tourists are showing behavioral changes that call for a revaluation of both, services and products currently offered. This new kind of tourist shows a more conscious consumption and the desire for objects representing a bond to the place visited, with some sort of reference to the region's nature, landscape and culture. These objects should reflect the experience the tourist went through in that territory (Figure 10).

Biome of the Region: "*The Southeast region of Brazil summarizes the major Brazilian ecosystems: rainforests and seasonal forests in the highlands in the east and south-center; Cerrado in west and center; Caatinga in the north; and mixed and Araucaria forests in the hills of the south and south-center.*" (Radambrasil, 1983; Veloso et al.,1991); "*Regions where different ecosystems occur side by side, forming a true mosaic*" (Desjardins et al., 1996); "*The natural vegetation is very diverse, featuring several Eco-types within a radius of 1 km (0.62 miles). South of the studied area , in the talus slope, the Seasonal Semi-deciduous Forest is the dominant vegetation, but nearby it there are mixed forests, with the occurrence of Araucaria. At the north and east, the savannas predominate. And from 1250m (4,000 feet) of altitude, at the mass metarenites, the area is dominated by alpine pastures*" (Radambrasil, 1983, Carvalho et al., 1994).

FIG. 10. ZOOM IN ON NATURE, BENCHMARKING AND CONCEPTUAL PROPOSAL. SOURCE: ELABORATED BY THE PROJECTS TEAM OF THE SCHOOL OF DESIGN OF THE UEMG (2010).

6. EXPECTED RESULTS

We expect, with this experience between the Minas Gerais State University - UEMG, Politecnico di Torino - POLITO and the Center Minas Design - CMD, that new opportunities will be open in the ambit of the stretches involved, having as support the design; that new opportunities of tourism, commerce and consume will appear, exploring, in a sustainable way, the whole potential of the originality of the local handicraft; that innovative interaction nets will be established, allowing the territorial marketing in the localities, touristic points, inns and hotels that compound the Estrada Real; and, above all, that it will promote a research in fertile field of academical study, throughout the creation of a rich space for the professional maturing of the students and professors, from Brazil and Italy, involved with the challenges of this project.

7. FINAL CONSIDERATIONS

The great contribution of the project is in the preparation of the students in the competences of design, which were experimented when dealing with the elements of the territory culture and its competitive integration. Besides that, it offers to the region feasible conceptual proposals, that can be implemented to enhance the touristic potential and, consequently, the income of each city.

8. CONCLUSION

The continuation of the Project: Design and Competitive Integration in the Estrada Real Territory / PER establishes, as next step, the projectual execution of the proposals, leading to their implementation. Knowing that each one of these proposals involves products with specific characteristics and implementation time frames, it is necessary to have them individually assessed, to determine with more precision their technical and financial specifica-

tions. The further development of the proposals will depend, therefore, on future actions of the entrepreneurs: CMD/UEMG, FAPEMIG and City Halls.

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10. ACKNOWLEDGMENTS AND NOTES

SYSTEMIC DESIGN APPLIED TO EVENTS

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An event can be defined as a happening with limited timing duration which involves huge flows of materials and people. The connection between an event and its hosting territory is generally neglected by focusing on earnings and back-image and this unavoidably damages both the social and the territorial environment.

The Systems Design applied to events focuses on their total planning, considering the material and non-material input-output flow related to the territory, and social and cultural aspects during the whole life-cycle: pre-event, event and post-event. These aspects are part of several fields that characterize the design of an event according to theme and dimensions and must be individually deepened, but also maintained in connection to each other with the aim to reduce the environmental impact and the waste of resources by leaving a positive feeling in the involved community.

By analysing some study cases we have understood the application of systemic principles on events. The flows of material resources as the research of the resources, their use and disposal in post-event, represent a huge environmental burden on the territory, as demonstrated by the study of *Salone Internazionale del Gusto*. The application of a Systems Design methodology through several editions has lead to a more rational use of the resources and a big reduction of wastes and CO_2 production.

A significant contribution in terms of impact reduction has been given by a better management of goods and people mobility, improved thanks to the positive planning experiences made in Turin during *Mondiali di Pattinaggio di Figura* and *Ostensione della Santa Sindone*, characterized by an excellent management of the flows of the involved subjects thanks to the positive exploitation of the public transport and the consequent reduction of the distances covered.

The analysis made on material flows has shown that currently the main output (pollution, waste and energy consumption) remain in the hosting territory as burdens damaging the non-material aspects related to the local community.

The non-material resources flows concern the exchange of values and culture deriving from the meeting of all the communities involved in the event: visitors, exhibitors, authorized personnel, resident people, local workers.

These aspects have been deepened in *Tortona Design Week* in Milan. In order to obtain a socially sustainable event it is necessary to have a shared responsibility of the event's community which has to take an interest in all the phases of the event by strengthening stronger interpersonal relationships.

Using a Systems Design methodology we transform a non-event, that is not linked to the hosting territory, into an event. Designing the sustainability of an event means using the potential resources in order to change burdens into benefits: in this way we balance environmental costs, emphasize territorial profits by promoting the wellness of the event's community and increasing the quality of the experience perceived by each person.

••• Event, systemic design, sustainability •••

1. EVENTS

> *"When a designer has to design an event such as a trade show or something similar, he mostly concentrates on the immediate message to the visitor trying to impress him with short lasting installations and languages. It is a very correct approach to lines up the best of design and planning choices intended to last a few days. When the event finishes, like a house of cards at the first bystander's breath, scaffold collapses and what was considered a quality before immediately becomes waste and refuse"*[1].

An event is a something where contents are transferred to the audience which uses them for a certain purpose within an environmental context. The purpose and the topic of the event are conditions necessary to the birth of the event, while audience and environmental context account for the feasibility and describe its success.

The connection between the contents showed in the event and the interest shown by those who attended the event represents the core of it, so as to involve, motivate and keep the attention alive on the main theme.

The term event comes from the Latin word eventus, e-venire that means getting out or happening. So you may see that it accounts for "*the becoming thing, the thing in relation with*" where "*thing*" means the object among subjects. By definition, the purpose of the event is

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[1] Bistagnino, L. 2008, August. *Esempi di sostenibilità applicata*. Slowfood, 35: p.44

therefore to relate things to people. The term means a specific and exceptional happening, which detaches itself from the routine of daily practice.

The essential features for any type of event are:

· temporariness and exceptionality: an event necessarily requires a change in normal practice within the context;
· immediate usability: audience is called upon to implement and immediately absorb the contents of the event;
· uniqueness and originality: the event is unrepeatable;
· emotionality and poly-sensoriality: the event make people leave unforgettable experiences, becoming an instrument of social aggregation and sharing emotions within the whole community of the event where groups of people communicate in real time on topics of common interest.

1.1. Input-output system

An event is something that involves huge flows of material and immaterial resources, incoming (input) and outbound (output).

Resources are:

· material resources: materials used, produced and consumed, energy used, people involved;
· immaterial resources: knowledge, culture, values attached to material resources involved.

Analyzing all the material and immaterial resources of an event will make possible to analyze and to design it in a more knowledgeable.

1.2. Context

Generally, an event is almost exclusively focused on its purpose. Actually you must take into account hosting territory, not only in terms of economic return and back-image, but also taking into account connections created by the event. In this way it is possible reduce environmental and social burdens that the event causes to the hosting territory, turning them into benefits.

The components of the environment of the hosting territory are:

· geographical context: physical environment that defines the boundaries of the event, which may coincide or may not with the geopolitical and cultural ones. Defining these boundaries will also delimit the cultural context and the local community;
· cultural context: set of values, traditions and customs shared by individuals of the local community, in relation to the territory in a certain period. The cultural environment is constantly changing and evolving with the environment itself because culture is determined by people themselves in relation to a particular historical period. The way in which culture evolves over time strongly depends on factors such as cultural receptivity, openness and interaction with other communities;

· local community: people who are daily involved in the geographical context of the event. They use the physical space of the geographical context of the event and create the cultural context attached.

Considering the environment of the event in all its aspects allows to take into account environmental and social interactions between event and its hosting territory as well as to create tools for the real feasibility of the event.

1.3. Community

The community of the event consists of people who are actively or passively involved in all the life-cycle of the event. The event's community is composed of local community and additional community. Additional community identifies all persons who, for different purposes, are involved in the event and go to the hosting territory.

Sometimes the coexistence between local and additional communities creates mutual phenomena of interference and annoyance. This is caused by different purposes of the two groups.

1.4. Life-cycle

Analyzing the life-cycle of the event is important for a complete analysis of its achievement, avoiding the mistake of considering only the days of the happening.

An event consists of three macro-phases:
· pre-event: planning, organization and setting;
· event: development of the event;
· post-event: dismantling, disposal and possible feedback management.

All phases are different in length and magnitude depending on the nature of the event. The success of the event is related to the management of each phase.
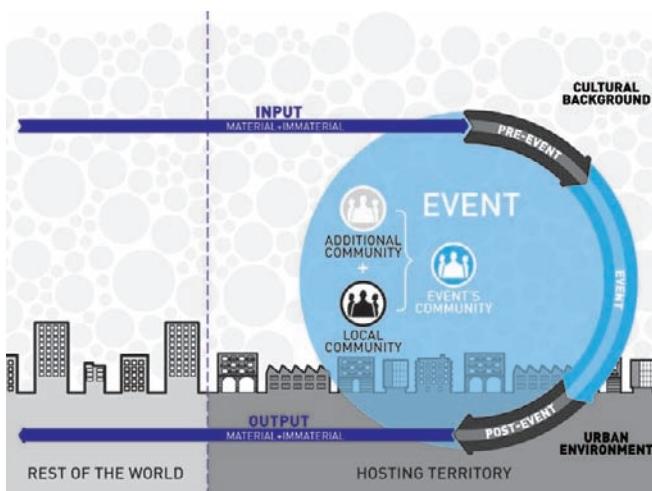

FIG. 1. COMPONENTS OF
THE EVENT.

1.5. Variabiles

Event is the practical result of a lot of variables that synergistically act. The whole reveals the complexity and specificity of each event that is the result of the infinite combination of variables.

The main variables are:

· accessibility: an event can be accessed by all (public), or can be accessed by few persons (private);
· purpose: an event can be directed to fun (fun and recreational purposes), to the sale or to promoted products (commercial and business purposes), to the education or awareness on issues of common interest (popular and charitable purposes);
· topic: each event is focused on a focal topic (sport, religion, art, policy, music, etc.);
· structures involves: an event can be hosted in existent structures, it can take place in set up places that normally are used for other purposes or in ad hoc structures;
· diffusion: it suggests the area involved by the event. It may interest individual buildings or neighborhoods, up to nations. In some cases, usually folk, events affect far cities simultaneously;
· configuration: each event can assume a configuration of trade show, meeting, conference, exhibition or performance;
· organization: an event can spontaneously arise from individuals or groups that need to show their work or from an ad hoc organization. This variable expresses the detail which organization structures an event with;
· frequency: it shows the cadence of an event. Sometimes events will not be repeated in the future, but usually the events, if successful, are repeated cyclically. They can take place monthly, annually or after several years;
· duration: it shows the time when the event occurs. It may last a day, a week or a month or include sporadic meetings that take place during a year;
· actors: persons who are actively or passively involved in an event. Actors are: organizers, sponsors, public and private companies, audience, communities, front-actors and back-actors that are the people who actively enact the event;
· interaction: each event may have a different degree of interaction for the audience. Some events involve directly the audience and pushes it to take an active attitude; others events transmit contents to the audience who passively absorbe them;
· target: the kind of audience to which the event is addressed;
· influx: determined by the number of people who are present; it depends on the event and therefore it is an important detector of event's dimension.

2. SUSTAINABLE EVENTS

An event can be defined as sustainable when is "*thought, planned, and realized in order to minimize the negative environmental impact, and to leave a positive inheritance to the hosting community*"[2].

To aim for zero environmental impact for an event is an utopian intention: it is better and more plausible talking about low impact event.

2.1. Evolution of sustainable events

The most widespread current trend is to approach the organization of events in a traditional way, focusing mostly on the economic aspects.

However, starting from the mid Sixties, thanks to a growing environmental sensibility and awareness, the organizers of events started to understand the importance of the sustainable management of own activities. This topic became central both in the choices about the production and the services, and in the consumption habits of the people.

The topic "sustainable development" was defined in 1987 in the Brundtland report, *Our common future*, as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*"[3].

The three fundamental dimensions of this kind of development are:

· *environmental sustainability*: ability to preserve over time the essential functions of the environment as a supplier of resources, waste receiving and direct source of benefit;
· *economical sustainability*: ability to generate income and employment for subsistence needs;
· *social sustainability*: ability to ensure conditions of human welfare evenly distributed among the whole population.

Today the term "sustainable event" defines many types of events characterized by an almost infinite combination of variables, but born with the same aim: convey the values, becoming an instrument of development and communication of environmental sustainability. Every event has a different level of sustainability connected to their specificity and to the possibility to adopt particular design solutions.

The development of sustainable design applied to the events was undoubtedly the result of a paradigm shift in the economy and of the overcoming of traditional marketing. This created new approaches such as that proposed by the "green marketing", according to the ecological and sustainable priorities, where the turning point, compared to the past, is the possibility to involve directly and actively people, educating and interacting with them.

Starting from its conception and organization, the sustainable event should aim to control and minimize any environmental, social and economic impacts during its whole life-cycle. For each field of planning operation, from waste management to the set-up, we identify ideas, suggestions and tips to increase sustainability: an event is sustainable only if it is the result of a proper synergy of best practices and it is the conclusion of joint work of different know-how and production realities of the hosting territory.

2.2. Standards and certifications

[2] Various Authors. 2009. *Green Meeting Guide 2009 - Roll out the Green Carpet for your Participants*. Paris, UNEP (United Nations Environment Programme), p. 70.
[3] Lanza, A. 2006. *Lo sviluppo sostenibile*, Milan, Il Mulino, p. 121.

Thanks to the increasing importance of the topic of sustainable development in world politics and to the first experiences of implementing environmental management systems for international events, in October 2007 the British Standards Institute has developed the BS8901, a standard which support the planning and the managing of sustainable events, resulting from the work of an interdisciplinary team composed of organizers, consultants, experts of events and sustainability.

Complying with the requirements described in the standard ensures that the common goals of sustainability are pursued in the planning stage, during the development and management of the event.

The standard is aimed to the promoters responsible for the planning of the event, to the organizers responsible for its management and to the services suppliers. About potential benefits of the BS8901, ISO decided to develop an international standard for the promotion of sustainable development and management of events: ISO20121.

This standard makes the event management more clear and it supplies the specific needs and characteristics of the field with an innovative and flexible approach and can be applied to any organization involved in the management of various type of event.

2.3. Relevant examples of sustainable events

The planning of sustainable events is not a practice rooted in the Italian territory yet, but has spread rapidly in other foreign countries. In 2008 only the 30% of the Italian companies were making eco-friendly events, while in Northern Europe, Great Britain and Canada were already close to the 80%[4].

Some relevant examples of sustainable events, thanks to successful planning choices, are:
· the Men's Volleyball World Championship 2010 (national example);
· the XXI Olympic Winter Games and X Paralympic Winter Games (international example).

The Men's Volleyball World Championship 2010 was held in ten Italian cities, with 600.000 participants, including athletes and spectators. It has been the first major sporting event that joined the SEE campaign (Sustainable Energy Europe), that is an EU project for environmental sustainability, and for this reason was renamed "Green Volleyball World Cup". The reduction of the environmental impact of the event has been possible through a mix of combined actions. All the energy used during the games was provided by local operators and produced by certified renewable sources and waste separation programs were implemented in sporting facilities. Moreover, the public transports and other sustainable mobility services, such as car and bike sharing, were enhanced to facilitate the reach of the sporting buildings to avoid urban traffic and catering services used biodegradable and compostable dishes. At the end of the event the involved municipalities planted trees to offset toxic gases emitted during the meetings. The Organizing Committee received the

[4] Visited in: December 13th, 2011, web site: http://www.meetgreen.com.

environmental certification ISO14001 from the international DNV (Det Norske Veritas) for how they have been managed the event.

The XXI Olympic Winter Games and X Paralympic Winter Games were held in Vancouver, Canada, in 2010, involving about 3.000 athletes. The main goal of the organization was to plan the event as sustainable as possible, starting from the design of urban structures and their post-event reuse or recycling. For example, the coverage of the building designed for the site of the speed skating was created using a kind of wood coming from trees infected by an insect, otherwise the trees would have been burned after being cut. For the structure that hosted curling was created a system of exploitation of the heat produced by cooling of the field competition for the nearby swimming pool, water faucets, and air ventilation systems. The athletes' village has been designed to be a model of sustainable community, with innovative solutions for energy efficiency. The complex has been awarded with the LEED certification (Leadership in Energy and Environmental Design). Even the sponsors joined this "green" philosophy by implementing personal initiatives. The medals were made from recycled materials: scrap metal and electronic components. Great attention was given to the transports: a new rail line allowed a rapid connection between the airport and the city, hydrogen buses have transported athletes and spectators, who were almost forced to use public transport, because the organization has bravely chose not to build parking for them close to sports complex.

Sustainable approaches to the events planning developed over the years, although guided by the same noble principle, created different ways of practical implementation: Politecnico di Torino, in particular, developed a sustainable approach guided by the principles of Systemic Design.

3. THE SYSTEMIC DESIGN METHODOLOGY APPLIED ON THE EVENTS

"The Systemic Design approach, as the "driving force" of the fair sustainable development, actives in consumers, producers and designers a behavioral innovation process without any sacrifice of specific components of the exhibit, but it optimizes all the flows that coming from promotion, exhibition and trade, adapting them to local quality of the territory, in order to educate, protect and promote a new economic model able to return time, space and dignity to the environment"[5].

Expanding the range of application of Systemic Design, the system methodology applied on the events was developed at the Department of Architectural and Industrial Design at the Politecnico of Turin, under the direction of the professor Luigi Bistagnino.

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[5] Bistagnino, L. 2009, August. *Approccio sistemico, da un altro punto di osservazione*. Slowfood, 41.

3.1. A new perspective

The systemic philosophy suggests a new kind of approach to the management of system-event, which allows to deal every issue related to it according to a new perspective.

The assumption of the new point of view of problems and the necessity to solve them in harmony with the natural processes lead to design open systems, which are sets of interconnected relationships, linked to other systems of the territory and to all the subjects involved. These systems are self-generative reality, which operate, maintain and reproduce themselves, co-evolving together. In this way you can see the overcoming of the concept of *linear production reality*, characterized by closed chains, where the transition from raw material to product/service is direct and marked by defined and sequential succession of actions.

The new approach to the system can promote new alliances among producers, promoters, distributors and buyers hiring new languages that allow the emergence of responsible and aware lifestyles. This aim upsets the design concept, involving the development of systemic patterns of production not more linear, whose focus is the man; man is considered as part of an ecosystem in which it weaves a dense network of relationships, able to develop new processes and opportunities that arise innovative business models within the territory in which the system is placed.

Consequently changes the task of the designer, who must encourage a thriving multi-disciplinary dialogue, taking into account all the aspects mentioned, in order to initiate an economic development in which there is a mutual and balanced bond between production, environment and society, with the aim of improving the quality of human life and planet weal.

The picture that comes out is a complex system of relationships that provides a direct and constant comparison of the different actors involved, which need to be aware of its responsibility and must be involved in a sort of co-planning of the event, since the beginning of the design *iter*.

3.2. Methodology steps

Considering the complexity of the system-event, the designer needs to manage optimally all its variables. The systemic approach arises as a tool for the proper management of the system-event, providing a design process characterized by four steps:
· holistic relief;
· identification of critical issues;
· definition of guidelines;
· systemic project.

The first phase is the holistic relief and it represents the "state of the art", in which you consider all the elements that make up flows and dealings, their reciprocal relationships and everything rises around the production and fruition process of products or services within the system.

The deepening of this phase is allowed by the breakdown of the event in its main areas of interest, such as set up or waste products, and by the analysis of the relationships established over time among all the subjects involved and between them and the environment. Every areas of interest represents the individual components of a complex but unitary system, whose evolution depends on their specific development and on relationships established between them and other entity of the context.

The identification of the areas of interest does not represent a simplification of the complexity of the system, but each area becomes the pivot around which wind activities and specific design choices, which released from its own ambit and treated independently could downgrade their potential. They allow you to break the event in order to analyze all its components in detail, without freeing them from the relationships network that link them with the initiatives of the other areas. Within each event you could identify a set of areas that are both recurring (waste, communication, etc..) both linked to the specificity of the event (food and drinks, community, etc..); each area takes on a different weight depending on the specific system-event.

Defined the holistic relief, it is important to analyze the data collected by qualitative and quantitative point of view and to consider its critical aspect; they concern not only flows of material and immaterial resources but also consider the relationships in place or in power that connect system, actors and environment. In this way the critical analysis allows to identify for each area of interest some issues that need to be solved by the application of design guidelines established *ad hoc*. In this way the previously identified areas become real design areas. The guidelines set represents the methodological basis on which the system project take shape.

3.3. Case studies about Systemic Events Design

Starting from 2006, systemic methodology has been applied to different kinds of events characterized by several themes.

Some significant events could be:

Salone Internazionale del Gusto e Terra Madre, 2006, 2008 and 2010 editions
· Configuration: shows market and international meetings
· Theme: food and wine
· Purpose: commercial, cultural and educational
· Duration: 5 days, from October 21 to 25, 2010
· Frequency: biennial
· Urban involvement: Turin, Lingotto Fiere and the Oval Lingotto area
· Accessibility: public event
· Distribution: world
· Inflow: more than 210.000 participants, including visitors, exhibitors and technical staff
· Target: food and wine lovers and specialist

· Structures involved: exhibit areas of Lingotto Fiere and Oval Lingotto
· Description: the event has been organized by Slow Food in collaboration with the Regione Piemonte and, since 2006, with Città di Torino.

The *Salone Internazionale del Gusto* and *Terra Madre* are two parallel events since 2004, when it was realized in Turin the first edition of *Terra Madre*; they are related but distinct from each other, because both agreeing with the founding principles of the philosophy of Slow Food and the themes chosen during the several editions, but each one is characterized by dynamics, players and especially different aims. Although they are different and directed to different subjects, the two events complete each other and together cooperate to optimize Slow Food intent about the creation of an international meeting point among traditional quality products, their producers and consumers, encouraging the exchange of experiences and old and new knowledges, disseminating their vitality and goodness.

Through its many editions, the *Salone Internazionale del Gusto* has continuously expanded, in form and content, becoming in 2006 the first event with reduced environmental impact, designed in a systemic way by combining the Slow Food ethic of *good, clean and fair* with the principles of Systemic Design to associate quality content to a "container" more and more sustainable.

Solenne Ostensione della Santa Sindone 2010
· Configuration: urban event
· Theme: religious
· Purpose: cultural and educational
· Duration: 44 days, from April 10 to May 23, 2010
· Frequency: variable, this exposition took place 10 years after the previous exposure
· Urban involvement: Turin, the Duomo area, piazza Castello, the Giardini Reali and the Museum of Archaeology
· Accessibility: public event
· Dissemination: world
· Inflow: 2.114.826 between pilgrims and technical staff
· Target: religious and practitioners
· Structures involved: Cathedral, adjacent structures, and temporary structures set up specifically
· Description: the event was organized by an official committee composed by Arcidiocesi, Comune and Provincia di Torino, Regione Piemonte and the support of public and private partners.

The main purpose of the event was allow the pilgrims, from all over the world, to live a memorable experience, respecting its sacredness and spirituality. Follow this aim, the whole section to reach the Sindone exibition was characterized by simplicity and austerity. The Committee has addressed some of its attention to the environment, according to the

papal encyclical "Caritas in Veritate" content and the Municipal Resolution "Mozione n°2" approved January 18, 2010, announcing the intention to plan every future events in Turin with a low environmental impact, starting from this event. As a result, the has been collaborate with the Department of Architectural and Industrial Design of the Politecnico of Turin, for the planning of the event. Sustainability represents an added value about the planning of this event without overlapping or overshadow the primary aim of the event.

Tortona Design Week
· Configuration: urban event
· Theme: art, focusing particularly on design
· Purpose: commercial
· Duration: 6 days, from April 12 to 17, 2011
· Frequency: annual
· Urban involvement: Milan, "Zona Tortona" (area between the Naviglio Grande and via Solari, whose heart is via Tortona and via Savona)
· Accessibility: public event
· Dissemination: world
· Inflow: 123.250 visitors for the year 2011 (rough estimate)
· Target: enthusiasts eager to keep abreast of innovations in the areas of design, art and graphics
· Structures involved: large exhibition spaces in the area, shops and courtyards transformed to host the show
· Description: the 2011 edition of *Tortona Design Week* has been organized by Superstudio Group, Tortona Location, Magna Pars and Tortona 37, companies of great importance in the area.
The *Tortona Design Week* took shape as a parallel event during the *Salone Internazionale del Mobile* in Milan; it was founded in 2001 by the proposal of Gisella Borioli to invite Giulio Cappellini to exhibit at Superstudio Più some new ideas of designers selected worldwide. Since that time the event has been repeated every year becoming larger and larger, taking the appearance of a real show of the new design; the participating companies proliferated and invaded the whole Zona Tortona. During the event courtyards of palaces, shops and streets turn to host the exhibition, that come out of the traditional exhibition spaces. Following the success of it, other district of Milan tried to replicate the successful model of Zona Tortona and created other design districts. However Zona Tortona still remains the most famous and important one.

4. DEFINITION OF GUIDELINES FOR SYSTEMIC EVENTS DESIGN
The systemic methodology applied to events is characterized by five guidelines, that distinguish it from traditional linear approach:

· parallel design of all the steps of event;
· creation and implementation of event documentation;
· design related to the specificity of event;
· design related to the territory in which the event takes place;
· creation and strengthening of internal relations among the actors of the event.

4.1. Parallel design of all the steps of event

Systemic methodology approaches to the organization of the event taking into account all its steps at the same time. Post-event is designed contemporaneously with pre-event, evaluating the impact that each design choice will be at the end of the event, so as to exploit the potential output transforming them from waste to useful resources useful for other systems. This approach differs from traditional linear one that consider different steps in a sequential manner, primarily focusing on contents and on event's day.

It is necessary to design a sustainable event in which all the actors involved in it take interest in all the steps of the event. Actually as with an industrial object, in event design we can speak about shared responsibility between all the actors during the whole event life-cycle. This means that individuals of additional community are interested in whole duration of the event, as well as local community is not only focused on the impact in pre and post-event. By extending their interest and responsibility to entire event life-cycle it is possible to transform it in an exchange moment, minimizing the phenomena of mutual disturbance.

4.1.1. Upstream design in Salone Internazionale del Gusto e Terra Madre

In the *Salone Internazionale del Gusto* and *Terra Madre* 2010 the Greenpallet by Palm are used to setting up stalls, market stands and other expositive areas. Applying Systemic Design there were used materials not traditionally aimed for exhibit, coming from other systems in order to extend their life-cycle and reduce the amount of waste produced. Greenpallet have been used by Slow Food free loan and at the end of the event they have been collected by Lavazza and Mapei for the transportation of their goods; allowing significant economically and environmentally savings.

Upstream design chooses by organizers allowed a waste reduction: the introduction of QR codes and implementation of the media allowed the reduction of paper, thanks to dematerialization of information; the distribution of bulk water from urban water supply projects and recovery of food (such as the initiative advanced "Good Samaritan") allowed food waste reduction.
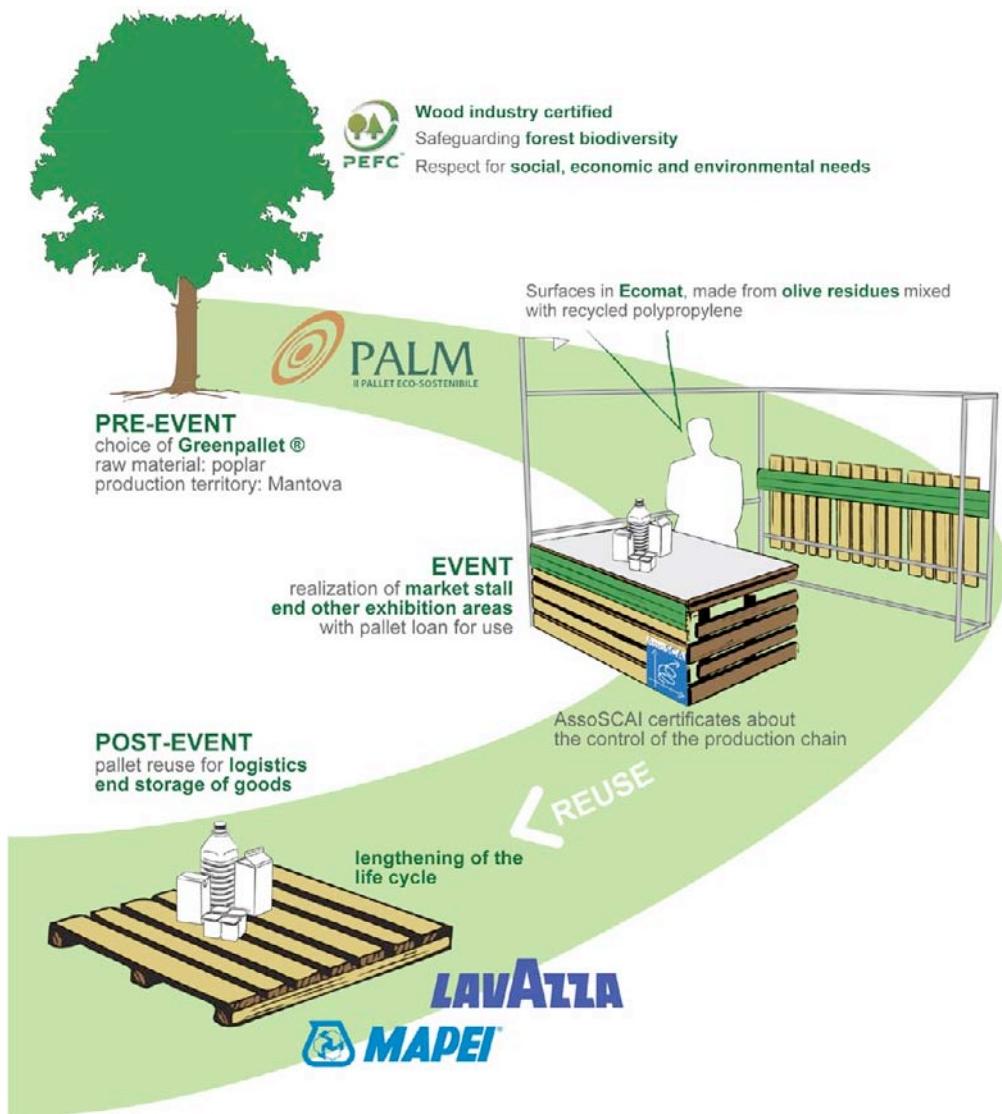
FIG. 2. GREENPALLET CASE STUDY.
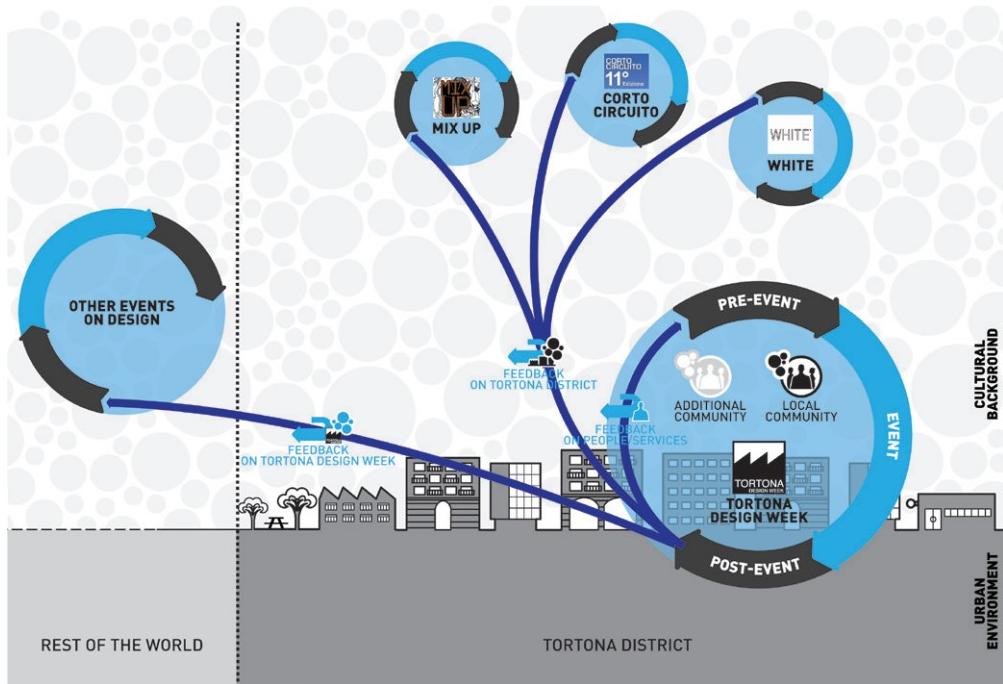
FIG. 3. FEEDBACK *TORTONA DESIGN WEEK*.

4.1.2. Tortona Design Week feedback system and network

Tortona Design Week project is designed to generate a series of useful output: feedback. Feedback system evaluates indirectly the event organization, allowing the event to regulate itself with the passing of time. There are three types of generated feedback. First feedback about people that subject meets during the event: they suggest changes or additions in the organization of new editions of the event. Then feedback concerning the elements of hosting geographical territory: they allow the improvement of district by the exportation of critical issues in relation to other events hosted during the year. Finally feedback on *Tortona Design Week*: they could be potentially exportable to other design events worldwide. This set of feedback provides a design input ready to be accepted and exploited, also in a transversal way.

In order to connect people who took part it has also created a specifically event network. Thanks to the web it was possible to maintain and strengthen exchanges among users who interact each other during all the steps of the event, particularly for communities geographically distant.

4.2. Creation and implementation of event documentation

It is essential to know system-event in order to reduce environmental impact. It is necessary to collect data and direct and indirect testimonies, information which will become part of

holistic relief. This documentation is a solid basis for implementing a sustainable design and it is an effective tool to quantify and verify the results obtained.

The collection modality depends on kind of information you want to collect; according to the resource system the approach will be quantitative or qualitative. An approach may be more appropriate than another depending on the event nature. However it is important to consider both aspects in order to have a complete view of the system.

4.2.1. Data collection in Salone Internazionale del Gusto and Terra Madre: last three editions
Systemic Design applied to Salone Internazionale del Gusto and Terra Madre shows how a meticulous, constant and ever-more detailed data collection, starting in 2006, allowed to design reducing environmental impact, reaching a decrease of about 65% in 2010.
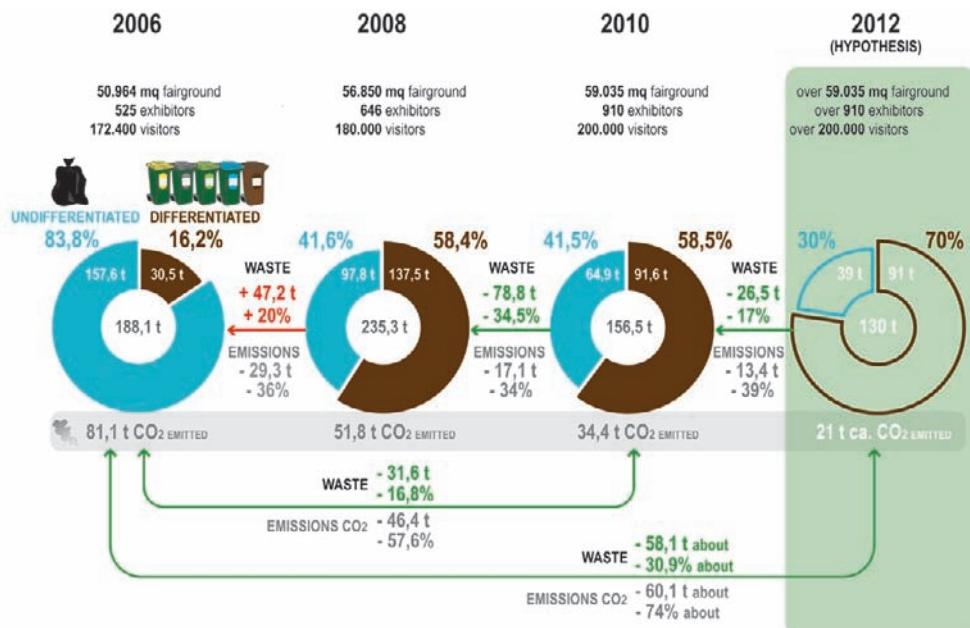

FIG. 4. WASTE AMOUNT COMPARISON: EDITIONS FROM 2006 TO 2010.

The most significant results are evident in the data related to waste tons produced during 2006, 2008 and 2010 editions. The decrease of waste produced in the 2010 compared to 2008 (34.5% less) is particularly significant, despite the increase of the number of visitors and the exhibition area; the ratio between the fraction of differentiated and undifferentiated waste remained almost the same, showing issues relating to quality of waste. Reducing waste and increasing the quality of the waste separation, there was every edition a reduction of CO_2 emissions (decrease of 60% in 2010 compared to 2006).

4.2.2. The exchange of values in Tortona Design Week

Some events are not constituted by components whose quantification is important for design purposes. In these cases it is more important focus on qualitative aspects, aimed at improving the perceived quality.

For *Tortona Design Week*, design has mainly focused on qualitative analysis in order to improve the experience of involved individuals. In particular the project is focused on the exchange of values within the event's community. There are two types of exchange:

· immaterial exchange, carried by people, brings to a cultural mutual enrichment;

· material exchange, carried by the materials of the event, brings on the hosting territory some objects that could be considered as potential resources. If resources meet the needs of local community and are suitable to appropriate territorial constraints, they could become long-lasting goods rather than burdens that affect the hosting territory.

Tortona Design Week is an example of how to reach event social sustainability considering the value of relationship exchange connected with material flows. Taking into account all the material and immaterial exchange is possible to reach the welfare of all the communities involved in the event. In this way social sustainability of the event integrates harmoniously itself with environmental and economic aspects.

Social sustainability is difficult to quantify because it is based on the qualitative concept of wellness[6], but it is essential as the optimization of material flows. Sustainable design of the event takes into account: the man within his environment; the improvement of perceived life quality; the creation of active and interested engagement of all the subjects involved by increasing their participation and collaboration. All these elements allow to live the experience of the event in a more deeply and relevant way.

4.3. Design related to the specificity of event

Every event born with own specificity and own intent; environmental issues should represent a value added, without override or interfere neither on the quality experience or on its main purpose.

4.3.1. The importance of experience during Ostensione della Santa Sindone 2010

The main aim of *Ostensione della Santa Sindone 2010* was to make the pilgrims live a unique and spiritually experience. Organizers knew that millions of people from all the world had been arrived in Turin. So Systemic Design allowed to reconciling the need to preserve the purpose of event with the good coexistence with local community needs. In this regard, it was focused on the management of urban mobility and on planning the path to the Holy Shroud. Path has been studied to avoid traffic congestion and queues along spiritual way. Thanks to a multimedia system for managing reservations, to imposition of a specific envi-

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[1] Barbero, S. 2009. *Design sistemico. Progettare la sostenibilità produttiva e ambientale*, Bra, Slow Food Editore, p.233.

ronmental ticket and to a studied logistics for pedestrian and vehicular traffic, pilgrim has lived his visit in tranquillity and avoid tensions that could have interfered with his spiritual experience. In the same manner city mobility was preserved for the duration of the event. These practices obtained by simple actions have enabled to reach objective of event respecting the environmental and allowing to reduce CO_2 emissions.
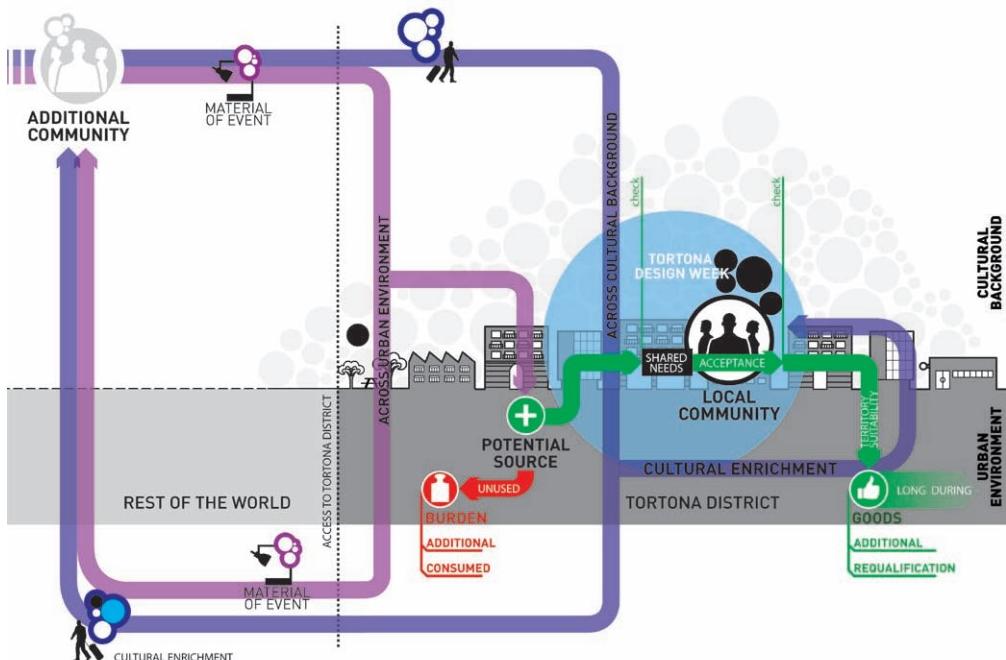

FIG. 5. MATERIAL AND IMMATERIAL EXCHANGE.

4.4. Design related to the territory in which the event takes place

The link between the event and its hosting territory is essential to ensure their sustainability, both as for resources management both as for established relations among the subjects involved.

If the event is not integrated with the hosting territory then we talk about non-event. Non-event is free from connection with the hosting environment and its components remain completely disconnected; consequently event loss its identity. So non-event is not sustainable and being engaged in it is like visiting a "non-place" (Marc Augè).

Planning an event means taking into account both the elements of event both the hosting territory ones, in order to integrate the event to the territory by the establishment of a system of mutual links.

The main difference between an event and a non-event should include the presence or

absence of a dense network of relationships. It requires the management of material and immaterial resource flows during the entire event life-cycle, focusing on inputs supply and outputs disposal, according to a qualitative enhancement of flows. It is possible to focus on increasing the overall sustainability, taking into account the needs of all subjects involved, promoting many virtuous actions involving the event and other territories.

An event that takes into account the territory triggers new alliances among all the actors involved, showing them a new sustainable economic model that puts different subjects on the network. The new business opportunities for sustainable respond to territorial community needs and demonstrate that the achievement of sustainability does not a loss of habits or an increase of business costs, but an increase in relationships quality.

4.5. Creation and strengthening of internal relations among the actors of the event

Relationships within the system-event are essential to achieve a real level of sustainability. The creation and strengthening of relations occurs simultaneously on two levels:
· organization, creating multidisciplinary exchanges able to enhance the planning of event;
· participation, creating active involvement of the event's community.

It is necessary to advert design areas of interest and their internal relations in order to have an overview of the system-event. These areas metaphorically represent people who interact tightly and continuously each other around a round table, where everyone has the same authority and importance of offering its expertise. This collaboration must involve all the steps of the event, not only pre-event. Dialogue among design areas inevitably generate relations aimed at solving shared problems. Relations quality determine the success of the event, also relatively to the environmental impact. The comparison of results generates design guidelines born by the synergistic collaboration of all the actors. This approach demonstrates the importance of multidisciplinary in systemic approach and clarifies how you build an open system.

Involving whole event's community refers to business relations that can bring economic benefits both social and cultural relations. It is essential to achieve this objective that the event is finalized, since the design phase, to creation of good relationships that provide a real engagement between the parties. In this way it will leverage and enhance the phenomena of material and immaterial exchange through active collaboration and informed participation.

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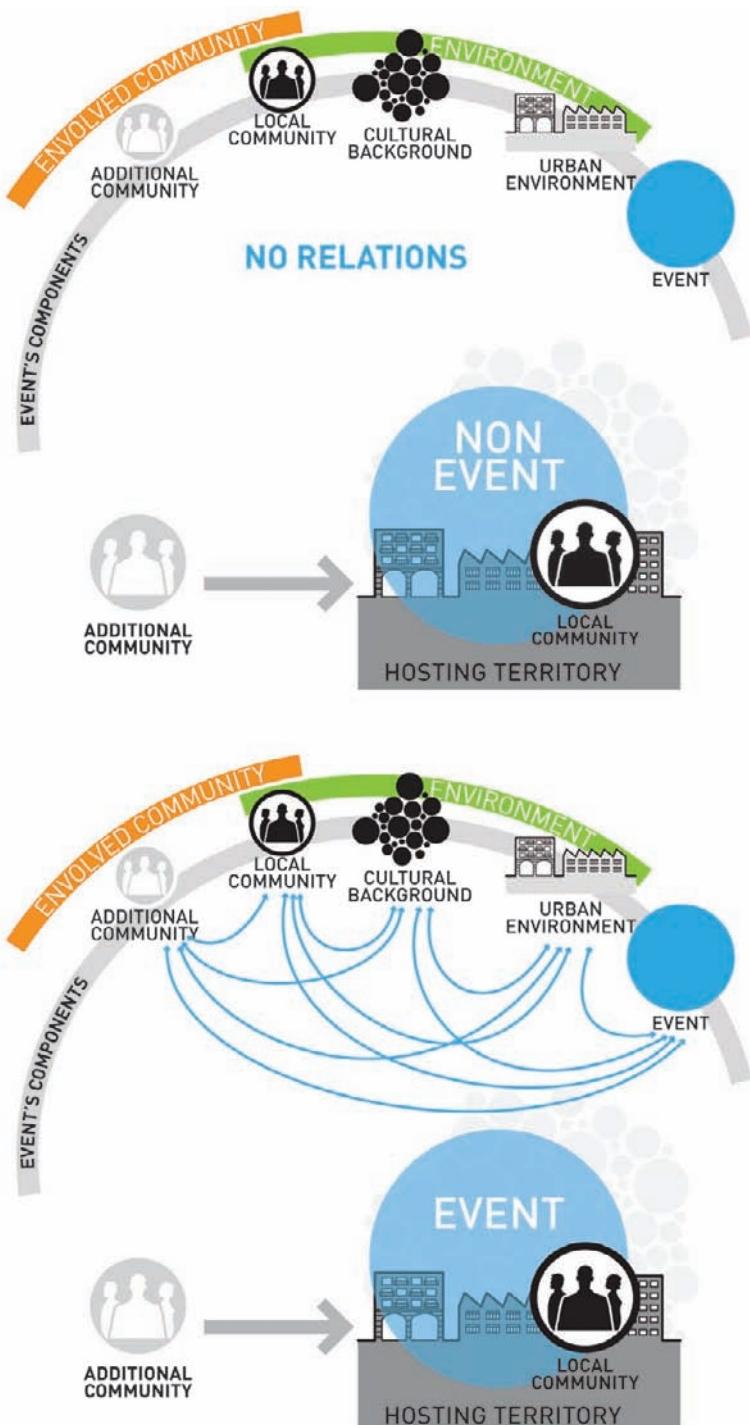
FIG. 6. COMPARISON BETWEEN EVENT AND NON-EVENT.
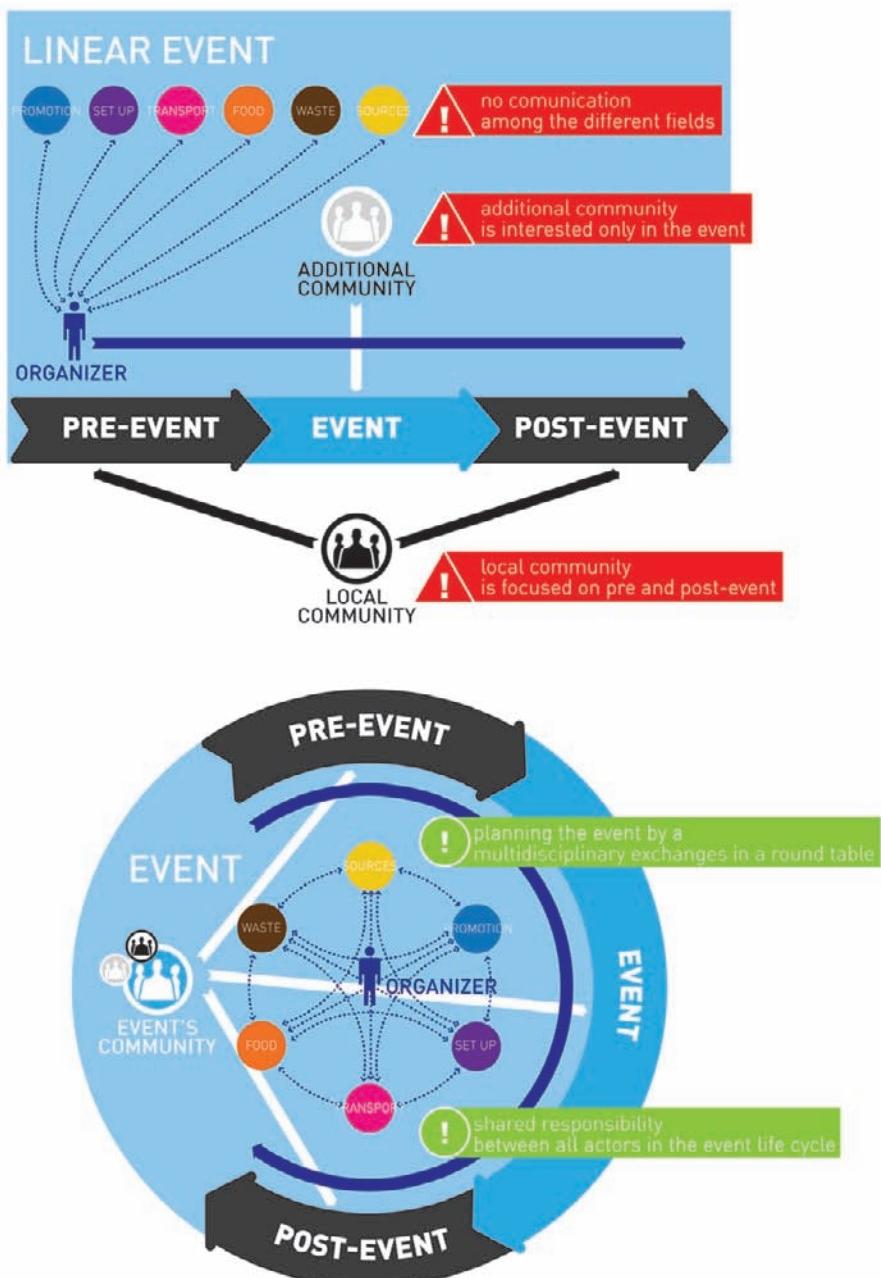
FIG. 7. ORGANIZATION AND PARTECIPATION AMONG THE ACTORS.

4.5.1. Proximity partners in SaloneInternazionale del Gusto and Terra Madre
Systemic Design for *Salone Internazionale del Gusto* and *Terra Madre* in collaboration with Slow Food has always aim to create relationships among all the subjects involved in the event organization.

Since 2006, the design of the exhibition has seen the birth of new relations among the various scenarios that, edition after edition, have been redefined and implemented by special and new forms of contracts and agreements, aiming at a gradual development. The improvement of the management of critical issues, which emerge in the analysis of relations among different subjects and fields, leads to an evolution more and more sustainable of the system.

Proximity partners are an example of this concept. They allowed the creation of a dense network of relations between local and adjacent reality, improving local economy and territory. Emergence and transformation of contracts and agreements with stakeholders has changed the flow of resources entering and coming out from the system. In particular, improving the quality of inputs has allowed to enhance output, turning them into valuable resources for feed new systems. The design chooses have led, especially for exhibit and food and beverage areas, systemic reutilization of a lot of materials, foodstuffs and exhausted oils.

4.5.2. The cooperation of event's community in the Tortona Design Week
Tortona Design Week project is an example of application of collaboration within the event's community.

Firstly trips for the transportation of exhibition materials are organized through the event network. Where it has not been possible to use materials found directly on hosting territory, stand designers have organized, thanks to "Design your event" platform, their trips by a system of sharing route. This has allowed reducing costs and consumption for transport. Another example is that, during the days of the event, host designers come into contact in order to provide a cheaper and high-quality offer for food and beverage using for happenings of the event.

Finally event's community, through "Desire your event" platform, could build a network of relations in order to achieve the realization of their desires about the event. Community members will mutually exchange their personal resources not exploited: it triggers a network of material and immaterial exchanges among the people taking part in the event, whose experience is qualitative enriched by this trading system. This allows to create a network of stronger relation.

4.6 The exportability of the methodology applied to systemic events
The systemic methodology applied to the events, illustrated in its early stages and its main guidelines, is applicable both to the improvement of the event itself and to other events. Benefits arising from the application to the events will have positive effects also on part of territory that are involved in the systemic project.

This dynamic is different from a linear approach and is in accordance with the theory of open systems, which involves the concatenation of the input-output system with other different activities.

5. CONCLUSIONS

All the issues analyzed leads to a downright cultural change about the point of view of how planning an event. Planning an event by systemic design methodology is possible to reach a real improvement of the qualitative aspects of the system-event generated. In the new system-event social, economical and environmental aspects will represent simultaneously the purpose and the tool.
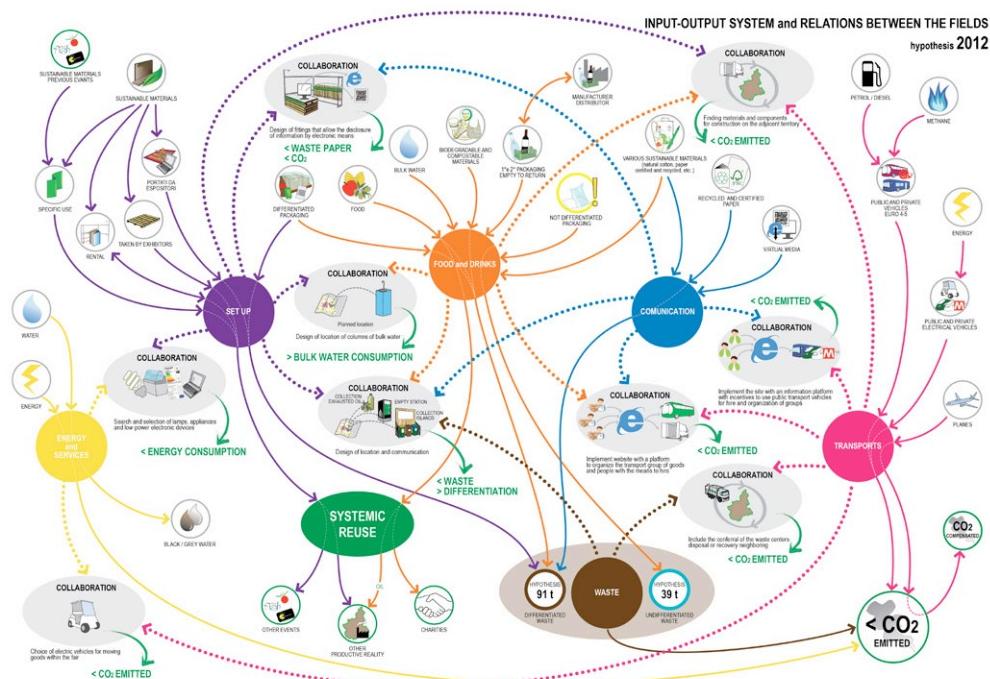

FIG. 8. PROJECT RELATIONS FOR *SALONE INTERNAZIONALE DEL GUSTO 2012*.

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"Innovation in Design Education" is the title of the Third International Forum of Design as a Process, the annual meeting of the Latin Network for the Development of Design Processes, held in November 2011 at the Politecnico di Torino, Italy. The book presents the results of the conference, which focused on three specific topics of the debate concerning design education: the relationship between schools and companies, innovative instruments for design teaching, and research for education. Particular attention was finally addressed to the host school, which was invited to present its experiences and research relating to the chosen theme.

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